Oil Spill Response Vessel Capabilities in the State of Washington: Use of Commercial Fishing and Other Vessels to Augment Oil Spill Response Capabilities

Prepared for
State of Washington Department of Ecology
Bellevue, Washington
Contract No. C0500277

File No. 05051
June 2005

THE GLOSTEN ASSOCIATES
Consulting Engineers Serving the Marine Community

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Executive Summary and Introduction

This report presents the results of an investigation conducted by The Glosten Associates to assess the benefits that vessels of opportunity can provide to oil spill response capabilities in Washington State. The study was requested by the Washington Department of Ecology, Spill Prevention, Preparedness, and Response Program. It examines vessels of opportunity, in general, and more specifically, fishing vessels, which constitute the largest resource pool suitable to augment a spill response. The key premise is that the local fishing vessels are a latent asset that could be utilized to support oil spill response efforts in the state. The report briefly presents historical data on oil spills, and then addresses the current status of the fishing fleet in terms of readiness, availability and capability.

The report concludes with a positive assertion that fishing vessels could become an effective asset, and presents some recommendations for the first steps towards creating a program to harness that asset.

Historical Perspective

The Glosten Associates investigated Washington State oil spills from 1986 to 2004. During that time, Washington suffered dozens of significant oil spills, the largest of which released more than 200,000 gallons. Literature searches produced no reports of response vessel shortfalls; only rarely were fishing vessels used to augment any response efforts. Several past programs were established to organize and train fishermen for spill response, but none of them have provided any return on the investment.

The level of spill preparedness in the state should not be defined by past experience, but rather by the potential for future spills based on examining the movement of vessels and petroleum.

The Current Situation: The study offers evidence of the following:

- All response organizations in the region have subcontractor arrangements for support vessels from commercial, non-fishing sources. The majority of these arrangements are on an "as-needed /

as-available basis" with all the response organizations drawing from the same pool of commercial resources.

- Unlike those in Alaska and British Columbia, none of the Washington response organizations have active, formal programs for recruiting, training and managing fishing vessels of opportunity. Some organizations periodically exercise their commercial non-fishing resources. Investment in the training of casual responders is minimal.

- There are more than 1100 fishing vessels in the region with features and capabilities that may be useful in an oil spill response.

The Analysis: The study supports the following analyses:

- A spill of 10,000 barrels can create a situation where the response could benefit from additional vessel resources.

- Current response organization vessel-of-opportunity programs may not be able to produce enough appropriate vessels to fill their needs, particularly in the first days of a response.

- A statewide program for identifying, vetting and enrolling fishing vessels could be a resource used by all response organizations.

The Recommendations: The study recommends and provides budgetary data for a conservative approach to creating a statewide fishing vessel program. For the program to be useful and successful, the following features are described:

- Appointment of a responsible program coordinator.

- An outreach effort to identify suitable vessels and vessel organizations.

- The establishment of minimum vessel and equipment standards for enrollees.

- The establishment of minimum training standards for vessel crews.

- The creation of tools to facilitate and formalize contracts with the vessels.

- The establishment of a focal point to collect, maintain and distribute up-to-date information on a continuing basis.

SECTION 1

Historical Review of Spills in Washington State Waters and Elsewhere

A statistical analysis of spills greater than 1000 gallons revealed two trends: 1) Spill frequency and total volume both show a downward trend since 2000, and 2) there is a slight trend toward higher frequencies and volumes in the winter months.

A literature search produced several articles discussing how vessels of opportunity had been used in actual spill responses.

1.1 Summary Statistics and Overview of Databases Used

1986 to 2004 Spills

Historical data were obtained from Dr. Dagmar Schmidt Etkin on oil spills in Washington state waters from 1986 to 2004 in which vessels of opportunity may have been of assistance. For verification, these data were compared with data recorded by the United States Coast Guard (USCG) in its nationwide Marine Casualty and Pollution Database and with the list of selected spills from the Department of Ecology 1997 report "Oil Spills in Washington State: *A Historical Analysis.*" There were four records that were excluded from the dataset, two of which were spills outside Washington waters, and two of which contained clearly erroneous information concerning the spill size.

One event: Nestucca *spilled 227,000 gallons*

Spills that released less than 1,000 gallons of petroleum product into the water were excluded from this analysis. The 1,000-gallon lower limit for "significant" spills was selected to represent spills where multiple vessels would likely be engaged in a response operation. There were more than 80 significant spills in Washington waters from 1986 to 2004. These data are shown on Figure 1-1 as red dots, sized proportionally to the spill volume. Only spills for which latitude and longitude were known are shown on the map. These spills represent 58% of the total number of selected spills over 1,000 gallons, and 70% of the total volume spilled.

The largest single spill event in Washington State during the time period was 227,304 gallons. In December of 1988, the tank barge *Nestucca* spilled No. 6 fuel oil offshore at the entrance to Grays Harbor as a result of an allision.

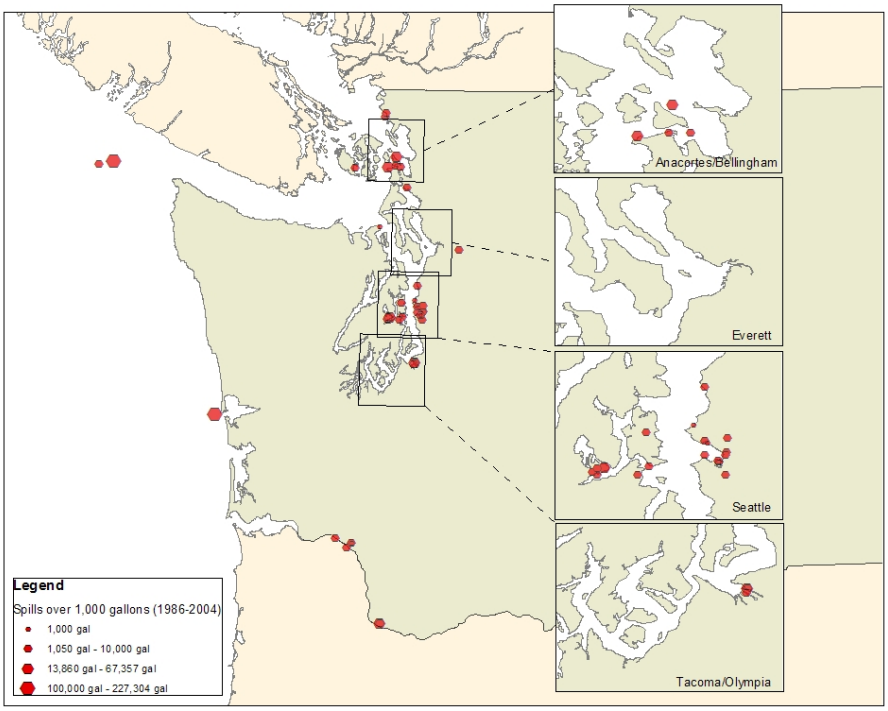

Figure 1-1: Distribution of historical spills 1986 to 2004 (> 1,000 gal)

1.2 Trends

Evidence of worst activity in winter

The plots below (Figure 1-2 and Figure 1-3) show the monthly and yearly spill event and spill volume distributions for the selected spills over 1,000 gallons. These plots show spills as a function of time of year. There appears to be a slight increase in number of spills and total quantity spilled in the winter months (December, January and February); however the correlation is not strong. June also exhibits relatively high spill activity measured both by number of events and total quantity spilled.

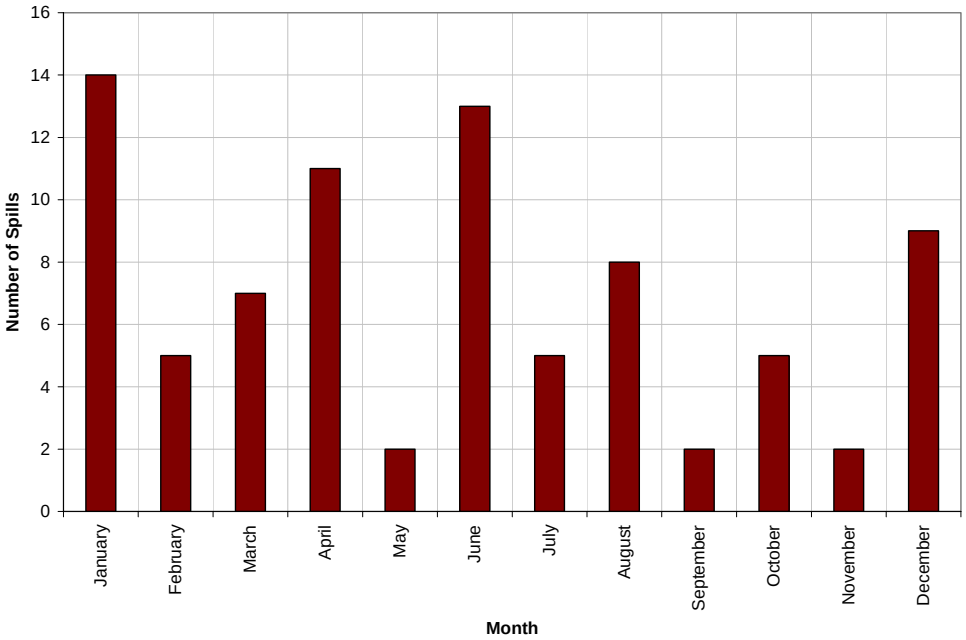

Figure 1-2: Number of spills by month 1986 to 2004 (> 1,000 gal)

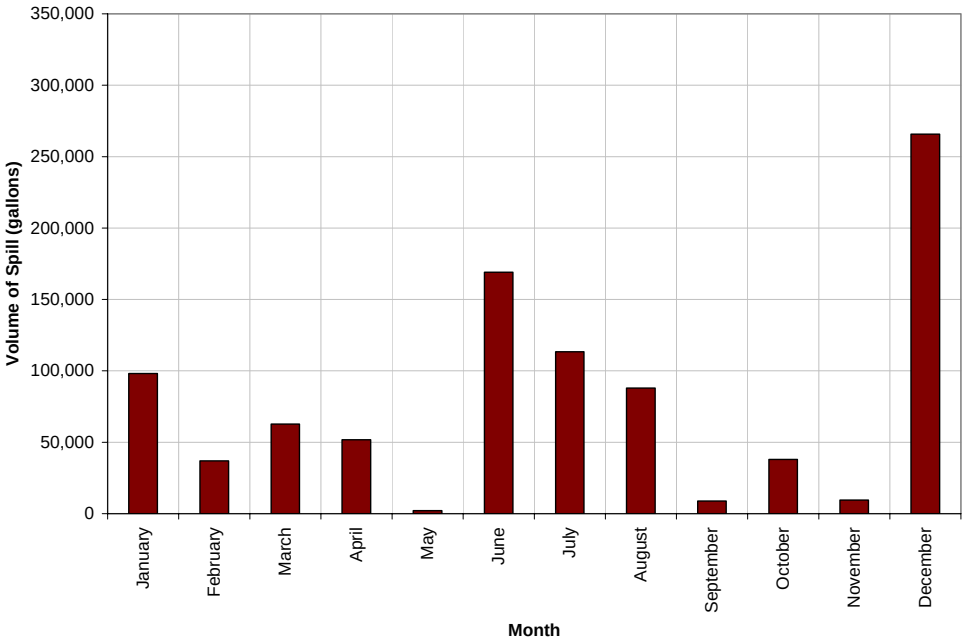

Figure 1-3: Volume of spills by month 1986 to 2004 (> 1,000 gal)

High variability year-to-year but declining since '2000

Figure 1-4 and Figure 1-5 show that the annual number of spills has, on average, been declining since 2000. A trend with respect to the annual volume of oil spilled is not apparent. It changes statistically from year to year. There is little correlation between the number of annual (or monthly) spill events and the annual (or monthly) volume of oil spilled.

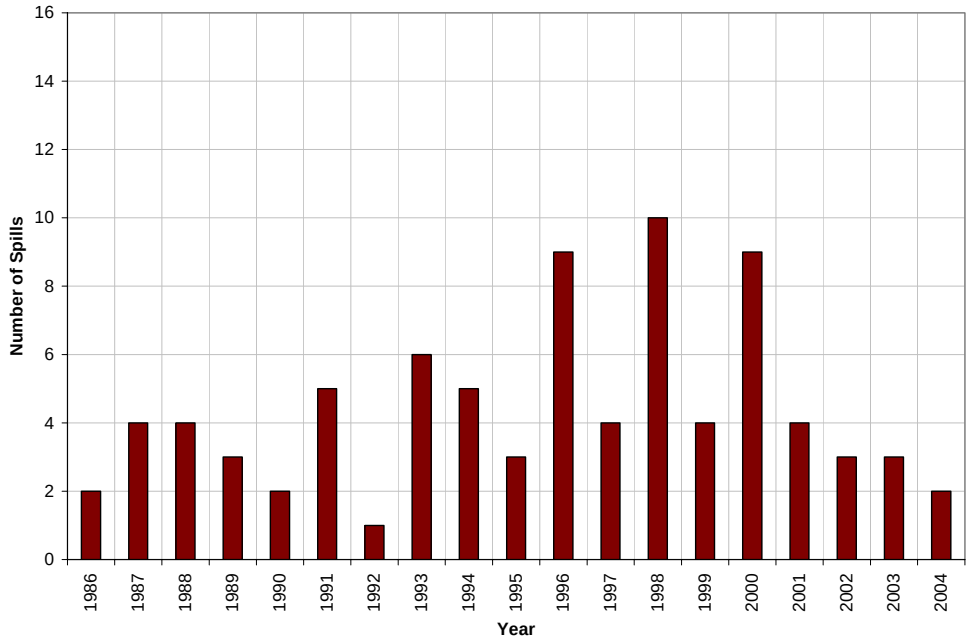

Figure 1-4: Number of spills by year (> 1,000 gal)

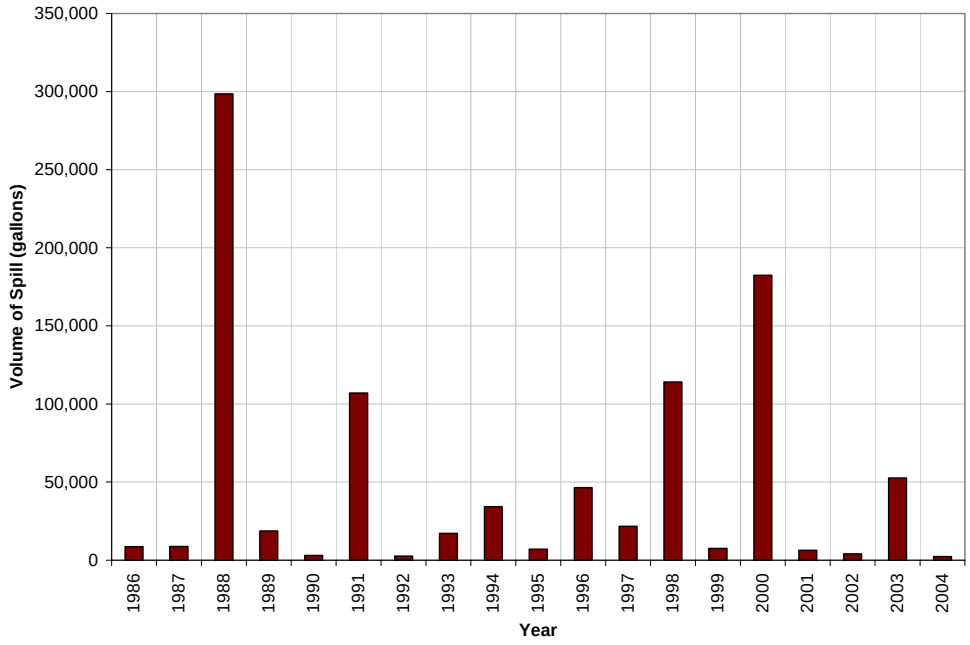

Figure 1-5: Volume of oil spilled by year (> 1,000 gal)

Figure 1-6 shows the volumetric distribution of the selected spills by product type. The plot shows that a significant portion of the spilled oil has been persistent, black oil (as opposed to gasoline and other light products), and requires aggressive spill response. Black oil is defined as crude oil, waste oil, fuel oil (not otherwise classified), and No. 5 or No. 6 Fuel Oil.

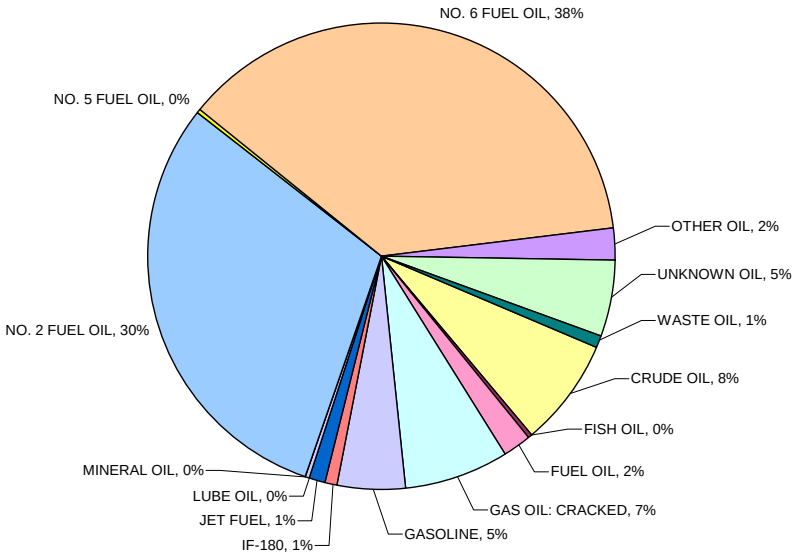

Figure 1-6: Spilled Oil by Category 1986 to 2004 (> 1,000 gal)

1.3 Lessons Learned from Spills beyond Washington State Waters

Few references to vessels of opportunity in literature

A broad-based literature search scanned more than a thousand papers and published articles worldwide. The search yielded few sources that discussed lessons learned in the use of vessels of opportunity. Those sources seem to indicate that fishing vessels (and other vessels of opportunity) can be used effectively in a response operation, but more for logistical duties than for recovery operations.

The one exception to this generalization is the response to the spill off Spain from *Prestige*. In that instance fishermen were actively engaged in on-water recovery, with remarkable success. No record was found documenting any difficulties the spill management team may have encountered in managing this resource.

Below are pertinent passages from this literature search.

1.3.1 Use of vessels of opportunity in actual spill response events

In the following cases, emphasis has been added in bold type.

- Brodie, Donald. "The *Kirki* Incident." Proceedings International Oil Spill Conference. Tampa, Florida. March/April 1993.

- "The offshore supply vessel *Lady Kathleen*, standing by an oil exploration venture off Freemantle, responded to the SOS and headed for the casualty, together with two other Freemantle-based vessels…. **United Salvage chartered *Lady Kathleen*** which reached *Kirki* when it was only eight miles from the coast and drifting towards the coastal reefs at 1.5 knots… Before abandoning the vessel, the crew of *Kirki* had not made suitable arrangements for boarding or taking the tanker in tow. This made connection extremely difficult in the weather conditions at the time, and *Lady Kathleen*'s master and crew displayed exceptional seamanship and courage in boarding and securing a tow line to the casualty" (p.202).

- "**Fishing vessels were chartered** to rig breaker boards of the Warren Spring type and to run through the thickest patches of oil closest offshore" (p.202).

- Cabioc'h, Fanch, Commander Nedellec, and Commissaire Lambert. "*Erika* vs. *Prestige*: Two similar accidents, two different responses. The French case." Proceedings International Oil Spill Conference. Miami Beach, Florida. May 2005.

Prestige – *Local fishermen had time to organize*

- Re: PRESTIGE, 2002: "Local authorities and fishermen had time to organize themselves and choose the best manual techniques to deal with the drifting oil. Their performance matched those of the specialized vessels. Basque fishermen took the lead in this party and some days, more than **200 Basque fishing vessels recovered up to 2,000 tons of emulsion and spoiled debris**… The organization of the recovery at sea guided by AZTI helicopters together with the waste management in harbours was impressing" (p.5).

Erika – *Fishing vessels were not used because of "no prior preparation"*

- Re: ERIKA, 1999: "**Fishing vessels or vessels of opportunity were not much used** during the ERIKA spill, mainly because there was no prior preparation to be on site in such a short period of time" (p.5).

- "**Vessels of opportunities and fishermen clearly have a role to play**, specially using nets, although these are only suitable for sticky and agglomerated pollutants" (p.6).

Table 1-1: Spill recovery amounts for Prestige and Erika spills

(all amounts in tons)	**PRESTIGE Wastes & emulsion**	**PRESTIGE Fuel**	**ERIKA Wastes & emulsion**	**ERIKA Fuel**
Specialized vessels unloading in Spain	14,946	5,381	-	-
Specialized vessels unloading in France	1,081	350	1,100	600
Specialized vessels unloading in Portugal	160	60	-	-
TOTAL Specialized vessels	**16,187**	**5,791**	**1,100**	**600**
Fishing boats unloading in Spain	34,924	15,737	-	-
Fishing boats unloading in France	1,363	500	-	-
TOTAL fishing vessels	**36,287**	**22,031**	**-**	**-**

Table 1-2: Assessment of clean-up for *Erika* and *Prestige* spills

	PRESTIGE	**ERIKA**
DRIFTING PROVISION (time before oil reached shore)	During 6 months	During 2 weeks
DRIFTING MANAGEMENT	Drifting committee Drifting buoys	Cedre and Meteo France
SHORE CLEANING	Efficient, slight tendency to beach over cleaning	Particularly efficient
WASTE MANAGEMENT	Fair Well organized	Poor 25,000 tons of waste
AT SEA RECOVERY	Excellent Good manage-ment of fishermen	Poor, but significant in terms of possibilities
COMMUNICATION	Daily situation charts on Cedre website	Poor at the beginning, no website

Shrimpers and fishing gear used for recovery

- Clark, Tricia, Beatrice Strong and Ben Benson. "Recovery of tarmats using commercial shrimping boats during the *Buffalo 292* spill." Proceedings International Oil Spill Conference. Ft. Lauderdale, Florida. April 1997.
    - "…a plan was developed to use vessels of opportunity in an attempt to utilize nets to snare and recover the tar mats… Basic operations consisted of towing a shrimp net between two shrimping vessels in a V-configuration, "trapping" the tar mats and patties in the mesh of the net, and then using dip nets to scoop the snared product into plastic bags. After a day of successful experimental operations, it was decided that **shrimp boats could be used as platforms to continue offshore recovery operations**, once a few modifications could be made according to the experience gained during the first day's operations. A night crew further developed a net system that was specifically geared toward recovery of the tar mats and patties. A section of a bale of fish net made of #12 nylon twine in a 1.75-inch mesh size in a length of 75 to 100 feet long by 22 feet wide was folded over three times, giving crews a net approximately 75 to 100 feet long by 7 feet wide with a very tight (less than 1 inch) mesh. A 0.25-inch galvanized chain was run through the bottom to serve as ballast to keep the net stretched down into the water, with a 0.50-inch poly rope woven through the top with fish floats for flotation of the top portion" (pp. 44, 49).
    - "Responders also found that tying pompom snare to the net helped with recovery. The tar mats and patties became entangled in the pompom snare and were less likely to be broken up by the net as it encountered them. Crews were also able to cut the soiled pompoms off the net, thus allowing the net to be used again" (p.49).
    - "After day 1 of the…operation , it was decided that support platforms would be necessary to make the response more efficient. **Two work boats were employed: one to serve as a command center for the operations and the other to act as the central staging area**" (p.49).
    - Central staging area vessel:
        - "eventually supplied with all necessary equipment needed to sustain the recovery operation: food, personal protective equipment, dip nets, roll-off boxes, plastic bags, and so on" (p.49).

- "A lined roll-off box…served as temporary storage for the recovered product and soiled pompom snare, which was unloaded at night while the staging vessel was being prepared for the next day's operation" (p.49).

Jon boats deployed from staging vessel

- "Crews in jon boats were deployed (weather permitting) from the staging vessel to assist the shrimp boats in maneuvering the recovery nets, in addition to using dip nets to pick up smaller patties and tar balls" (p.49).

o Command center vessel:

Cell phones found useful

- "For maximum recovery potential, a helicopter was used to spot the concentrations of tar mats and to relay the GPS location to the command center vessel…via radio…[The command center vessel] would then direct the shrimp vessel captain to the latitude and longitude given by GPS via cellular phone,…" (p.49).

o "Recovery operations [on the vessels] were manned by contractor cleanup crews. Each vessel carried a crew of six to eight response technicians. These response personnel were not used to performing manual cleanup operations on small vessels under the sea conditions encountered during this response. As a result, seasickness was a continual problem" (p.49).

o "Heath and safety personnel (certified paramedics) were permanently assigned to the…fleet during the entire operation and were based on the command vessel…These personnel carefully monitored the seasickness problems of the crew and ceased operations if conditions warranted. In addition to the monitoring program, crew work shifts were modified to accommodate each individual's ability to work in a given sea state" (p.49).

o "To further maximize crew safety, the deck had to be continually maintained with fresh sorbent materials to prevent slips, trips, and falls" (p.49).

o "In using the **shrimp boats**, no extraordinary problems were encountered during the decontamination process. Both work crews and **decontamination personnel had to give careful attention to wooden surfaces**. In addition, the specially rigged **nets were deemed** suitable only for recovery of the tar mats and patties; obviously, after being used to recover

hydrocarbons, they were **unsuitable for further use** in the commercial shrimping industry and were disposed of" (p.49).

- "**Another issue that had to be dealt with was payment of the crew…Traditionally boat crews receive payment at the time the catch is sold, usually daily, and in this case they were caught unaware when the contracts specified payment otherwise**" (p.49).

- "Although it was not anticipated that large volumes of tar mats would be recovered, any oil kept off the shoreline was considered a success" (p.49).

- Smith, Joseph BH, Capt. Richard J Asaro, and Cdr. Harlan Henderson. "Oil, rats and salvage: The grounding of the *Hyundai #12*." Proceedings International Oil Spill Conference. Tampa, Florida. March/April 1993.

  - "Because fishing season had just ended, vessels were readily available locally" (p.214).

  - "…a **chartered fishing vessel was moored alongside the ship to serve as a platform for divers** conducting a hull survey" (p.214).

  - "**Pollution contractor crews were transported to the fishing vessels**, and deployment of containment boom was begun in the sensitive areas" (p.216).

  - "The successful mitigation of the grounding of the *Hyundai #12* can be attributed in large part to cooperation among the dozens of public and private entities involved in the response" (p.216).

1.3.2 Use of fishing nets for heavy oil recovery

Additional experience using fishing nets for recovery

- Brown, HM and RH Goodman. "The recovery of spilled heavy oil with fish netting." Proceedings International Oil Spill Conference. San Antonio, Texas. February 1989.

  - "Three nets, each 10 m long by 0.5 m wide and of different mesh sizes, were used in the tests. Fifty elliptical Styrofoam floats sewn into the upper hem provided a buoyancy of 2.5 kg/m and resulted in a freeboard of about 5 cm and a draft of 50 cm. The mesh sizes and construction details were as follows:

- Net No. 1 (fine net): two layers of ¼ inch braided nylon (type 210/9) with 1 mm twine and effective hole size of 1 mm by 1 mm.

- Net No. 2 (medium net): one layer of ¼ inch braided nylon with 1 mm twine and 1.9 mm by 1.9 mm hole size.

- Net No. 3 (coarse net): one layer of ½ inch braided nylon (type 210/10) with 1.2 mm twine and 5.5 mm by 5.5 mm hole size" (p.123).

o "Although this study of net capabilities was a preliminary one, some useful observations can be made.

1. Sprayed Cold Lake bitumen, which will float initially, may be collected easily with any net.

2. Spilled liquid oil was neutrally buoyant and floated as large semi-submerged globules. This oil could be corralled by the nets, and when fresh, adhered to them readily.

3. There was no oil leakage with the fine net at speeds of up to 0.3 m/s and small but possibly acceptable leakage with the medium mesh net.

4. Slightly weathered globules of oil appeared to have a viscous skin that retarded extrusion through the net.

5. The empirical equation of Delvigne appears to overestimate the leak rate for Cold Lake bitumen.

6. The nets were easily deployed and towed well through the water.

7. Up to about 30 kg/m^2 of oil adhered to the net without seriously affecting its towing characteristics.

8. Measured towing stresses are lower for the nets than for similarly sized booms.

9. Heavily oiled nets were difficult to remove from the water, and showed some loss of oil.

10. Without a special cleaning apparatus and the use of solvents, it does not appear that the nets can be successfully cleaned" (p.125-6).

1.3.3 Vessel shortages identified in spills

Landing craft, tank vessels and general logistics vessels in short supply

The most frequently reported shortages in spill response vessels were tank vessels (for temporary storage of recovered oil) and landing craft style vessels (supporting beach cleanups). Unfortunately, neither of these shortages would be alleviated with a formal fishing vessel program. Other common shortages were a lack of transportation vessels for equipment, consumables and personnel. In particular, larger spills frequently required the movement of people to disparate locations: reinforcement responders, regulators (shoreline cleanup assessment teams), wildlife recovery specialists and other observers.

These logistical shortages could benefit from a formal fishing vessel program.

SECTION 2

A Summary of the Dedicated Fleet of Spill Response Vessels

The dedicated fleet of vessel response assets in Washington is well documented in the Northwest Area Contingency Plan Equipment List.

The Northwest Area Contingency Plan Equipment List (nw_list.xls) was obtained from a link found at: http://www.ecy.wa.gov/programs/spills/preparedness/preparednesstable.htm.

For the purpose of this study, the Northwest list was filtered only for dedicated response vessels of at least 20 foot length. Vessels smaller than 20 feet in length were found to be plentiful within the response community and are limited in their utility in semi-protected waters. Hence, they were not of interest.

2.1 The Northwest Plan Resource List Filtered for Vessels Only

The filtered, sorted list of dedicated vessel resources is included in Appendix A. It lists about 200 vessels of various descriptions, including 35 recovery vessels, and 61 barges (including barges believed to have been included on an "as available" basis). The remainder are workboats and support craft of various types. This filtered list was used as the basis of the known, dedicated vessel resources from which the hypothetical "dream team" response equipment list was drawn in Section 5.

2.2 Oil Spill Response Vessel Fleet Geographical Distribution

Response vessels widely distributed

In Figure 2-1 the oil spill response vessel fleet distribution is plotted (in green) along with historical spills (in red), disregarding the classification of any of the vessels. It is encouraging to note that dedicated response vessels are deployed near virtually all the historical spill sites for which the location was known. That encouragement is moderated by the knowledge that, for instance, the site of the state's largest spill (*Nestucca*/Grays Harbor) is covered only by smaller *fast response vessels* (FRVs).

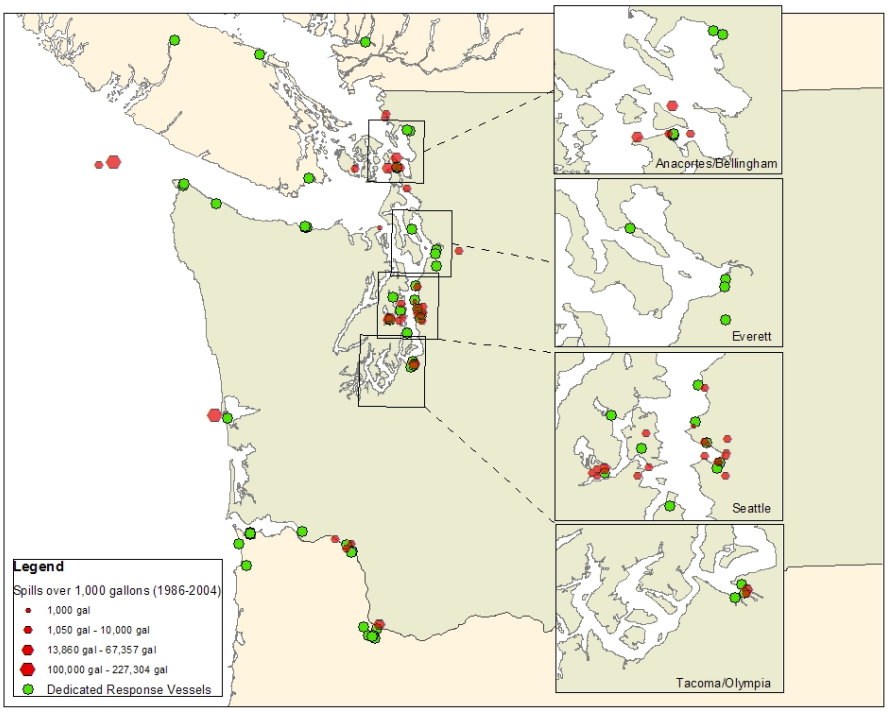

Figure 2-1: Spills by Volume (1986 - 2004) and Dedicated Spill Response Vessels (2005)

SECTION 3

An Analysis of the Available Fishing Fleet in the Region

Several specific vessel classes in the Washington-based commercial fishing fleet could be helpful in a spill response, but it will be difficult to predict vessel availability. Vessel availability will be particularly limited or difficult to organize between August and October, when the majority of the fleets are actively fishing. It is assumed that vessels actively fishing are not necessarily available for response. This report estimates that approximately 1100 vessels suitable for spill response are seasonally homeported in Washington State. Further study is required to confirm the locations of these vessels outside the fishing seasons.

3.1 The Washington Commercial Fishing Fleet

Fifteen distinct fisheries and two fleets – local and distant

Coordinating commercial fishing vessels in Washington state waters for non-fishing activities will be a difficult challenge. Vessels from Washington state homeports travel to approximately 15 distinct fisheries. In this study these fleets are classified as *distant* or *local*, a rough classification based on the distance from a vessel's homeport to its fishing grounds.

Both fleets are subject to complicated seasonal fisheries for approximately 20 species. A wide variety of fishery combinations are possible at the discretion of each vessel owner. As specific fisheries collapse, some vessels shift to other fisheries with different seasons; the remainder will release crew, decrease maintenance or lay up the vessels. The dynamics of vessel deployment relates closely to the status of Alaska and North Pacific fisheries, which may undermine long term plans to coordinate fishery vessels for non-fishery activities. It should be noted that these conditions have apparently been overcome in the fishing vessel programs operated by other oil spill response organizations.

Vessel availability is variable and difficult to predict

There is a higher presence of fishing vessels in Washington from late fall to early spring, although fishery seasons span the entire year. The local fleet, which is most likely to call at Washington homeports throughout the year, is the most economically stressed fleet.

While the distant water fleet is more economically stable and more likely to be predisposed to serve, they are least likely to be standing by in Washington

homeports when a spill occurs. Port calls are vessel service oriented and typically scheduled from twice yearly to every 18 months.

Over 1100 vessels of interest in Washington

The Glosten Associates and Natural Resources Consultants have assembled a preliminary count of vessels potentially useful for a spill response in Washington waters. The count is based on port data, personal contacts and interviews with fishermen. This pool of vessels is now believed to include:

- 210 purse seiners
- 130 tender/buyers
- 125 Alaska crabbers
- 150 local dive fishery boats
- 500 local gillnetters

About half of the vessels suitable for oil spill response have their homeports in the Seattle area. The other half of this pool is distributed among eight other commercial fishing port zones and private moorings throughout the state.

3.1.1 Fleet characteristics

Local fleet is in constant flux due to changes in fisheries

Fourteen vessel types make up the Washington homeport commercial fishing fleet. Vessel characteristics, seasons and fleet sizes vary widely among fisheries. Some fisheries have suffered volatile decreases and outright collapse from species depletion and market forces over the past decade. It is unlikely that vessel counts in declining fisheries will remain accurate for any extended period.

A report for the Port of Seattle (Natural Resources Consultants, 1999) presented statistics on the characteristics and seasons of the entire Washington homeport fleet. Table 3-1 summarizes material from that report as well as gear lists from June 2005 dock surveys, current fishery seasons, and estimated 2005 vessel counts for the subset of fishing vessels appropriate for spill response. It should be noted that certain fisheries that were declining in 1999 have been further depleted. In Table 3-1, vessels in these fisheries are noted as "declining."

The combination of vessel characteristics and seasons presented in the table are key to determining what vessels are suitable and potentially available for spill response.

Table 3-1: Washington homeport fishing vessel characteristics

	Fleet	Qty	Crew	Size (ft)	Hull Material	Deck Gear	Nav Gear	Communication Gear	Species	Season (mo)
Distant Water Fishery	AK Groundfish Catcher Trawlers	86*	5	80-180	Steel	Stern ramps, trawl winches, flood lights, net reels, dinghy	PC Nav suite, 2 fathometer, 2 GPS, 2 radar	VHFs w/ scramblers, SSB, Sat phone, CB, weatherfax, email (Sat or SSB), hailer	Pollock, cod, flounder	Jan-Apr Jun-Oct
	AK Groundfish Processors	5*	100-150	300 –680	Steel	Product processing plants, dinghy	PC Nav suite, 2 fathometer, 2 GPS, 2 radar	VHFs w/ scramblers, SSB, Sat phone, CB, weatherfax, email (Sat or SSB), broad band data, hailer	Pollock, cod, flounder	Jan-Apr Aug-Oct
	AK Catcher Longliners	191*	5-6	40-80	Wood, plastic, steel	Layout varies, dinghy	PC Nav suite, 2 fathometer, 2 GPS, 2 radar	VHFs w/ scramblers, SSB, Sat phone, CB, weatherfax, email (Sat or SSB), hailer	Halibut, cod, sablefish, rockfish, some salmon	Mar-Nov
	AK Freezer Longliners	29*	5-6	120-190	Steel	Limited lift gear, product processing plants, dinghy	PC Nav suite, 2 fathometer, 2 GPS, 2 radar	VHFs w/ scramblers, SSB, Sat phone, CB, weatherfax, email (Sat or SSB), hailer	Cod, halibut, sablefish, turbot, some salmon (summer)	Jan-May Sep-Nov
	AK Crabbers	125	5-6	80-180	Steel	Cranes, flood lights, dinghy	PC Nav suite, 2 fathometer, 2 GPS, 2 radar	VHFs w/ scramblers, SSB, Sat phone, CB, weatherfax, email (Sat or SSB), hailer	2 types Tanner, 3 types King. Some cod, herring and salmon (spring & summer)	Jan-Apr Sep-Dec
	AK Salmon Gillnetters	569* (declining)	1-3	32-42	Metal, wood, plastic	Net reels	Fathometer, GPS chartplotter, radar	2 VHF	Salmon. Some herring, sardines, groundfish, tuna (fall)	May-Oct
	Offshore Salmon Trollers	103* (declining)	1-2	25-65	Metal, wood, plastic	Trolling gear	2 fathometer, GPS chartplotter, 2 radar	2 VHF, SSB, CB	Salmon. Some herring, sardines, groundfish, tuna (fall)	May-Oct

	Fleet	Qty	Crew	Size (ft)	Hull Material	Deck Gear	Nav Gear	Communication Gear	Species	Season (mo)
Distant Water Fishery	AK Purse Sieners	210	4-7	58	Metal, wood, plastic	Mast boom, flood lights, power block	PC Nav suite, 2 fathometer, 2 GPS, 2 radar	VHFs w/ scramblers, SSB, Sat phone, CB, weatherfax, email (Sat or SSB), hailer	Salmon. Some herring, sardines, groundfish, tuna (fall)	May-Oct
	AK Tendering Processors	38*	2-3	125-350	Steel	Cranes, flood lights, mast booms, dinghy	PC Nav suite, 2 fathometer, 2 GPS, 2 radar	VHFs w/ scramblers, SSB, Sat phone, CB, weatherfax, email (Sat or SSB), broad band data, hailer	Multi-species	Jan-Oct
	AK Tender/buyers	130	4	50-110	Steel, wood	Cranes, booms, dinghy	PC Nav suite, fathometers, 2 GPS, radar	VHFs w/ scramblers, SSB, Sat phone, CB, weatherfax, email (Sat or SSB), hailer	Salmon, herring	May-Oct
Washington Fishery	Local Groundfish	191* (declining)	5-6	60-80	Steel, wood	Net reels, flood lights, boom	2 fathometers, GPS chartplotter, radar	2 VHF, CB	Various groundfish	All year
	Local Gillnetters	500	1-5	25-80	Metal, wood, plastic	Net reels,	2 fathometers, GPS chartplotter, radar	2 VHF	Salmon	Aug-Oct Varies by year
	Local Dungeness Crab	871* (declining)	2-4	30-80	Metal, wood, plastic	Boom, crab block	2 fathometers, GPS chartplotter, radar	2 VHF	Dungeness Crab	Dec-Feb, some all year
	Local Dive Fisheries	150	2-4	20-60	Metal, wood, plastic	Davit	Fathometer GPS, radar	VHF	Geoducks, urchin, abalone	Varies by year

*1999 data

3.1.2 Navigation, Communication and Safety Equipment

Safety gear beyond what is required will vary with owner preference

One can assume that most of the navigation, communication and safety gear listed below will be found aboard Washington's fishing fleet. This gear is based on USCG requirements and the preferences of the operators. Equipment may vary among vessels, even with vessels of the same fishery.

In addition to the safety gear required by the USCG and Washington State, operators may add items. Some companies may have commercial automated vessel tracking systems installed on fleet vessels. Automatic Identification Systems (AIS) are being phased into the USCG required safety gear lists on some vessels. Although intriguing as a management tool, these systems are unlikely to be useful in a spill response where the coordination of vessels normally takes place in the field.

Basic gear is found on most fishing vessels

The following safety gear is likely to be found on most fishing vessels.

- Immersion suits
- Life buoy w/ line
- Life raft
- Distress signals
- Fire extinguishers
- Marine Sanitation Device (MSD) with tank
- Compass
- Anchors
- Coast Pilot
- Light list
- Tide/current tables
- General alarm
- High water/bilge system
- Flame arrestors (gas inboards)
- Fire suits, SCBAs (when more than 16 persons onboard)
- VFH & HF radios, EPIRB
- GPS
- Fathometer
- Radar
- Radar reflectors

Deck gear requirements and suitability for spill and clean up work is addressed in Section 3.2 *Discussion of Vessel Suitability for Duty*.

3.1.3 Fleet homeport locations

Interviews with port authorities provided a preliminary count of about 1,100 fishing vessels suitable for spill and cleanup response. The homeports of these vessels are shown by location on the following map (Figure 3-1).

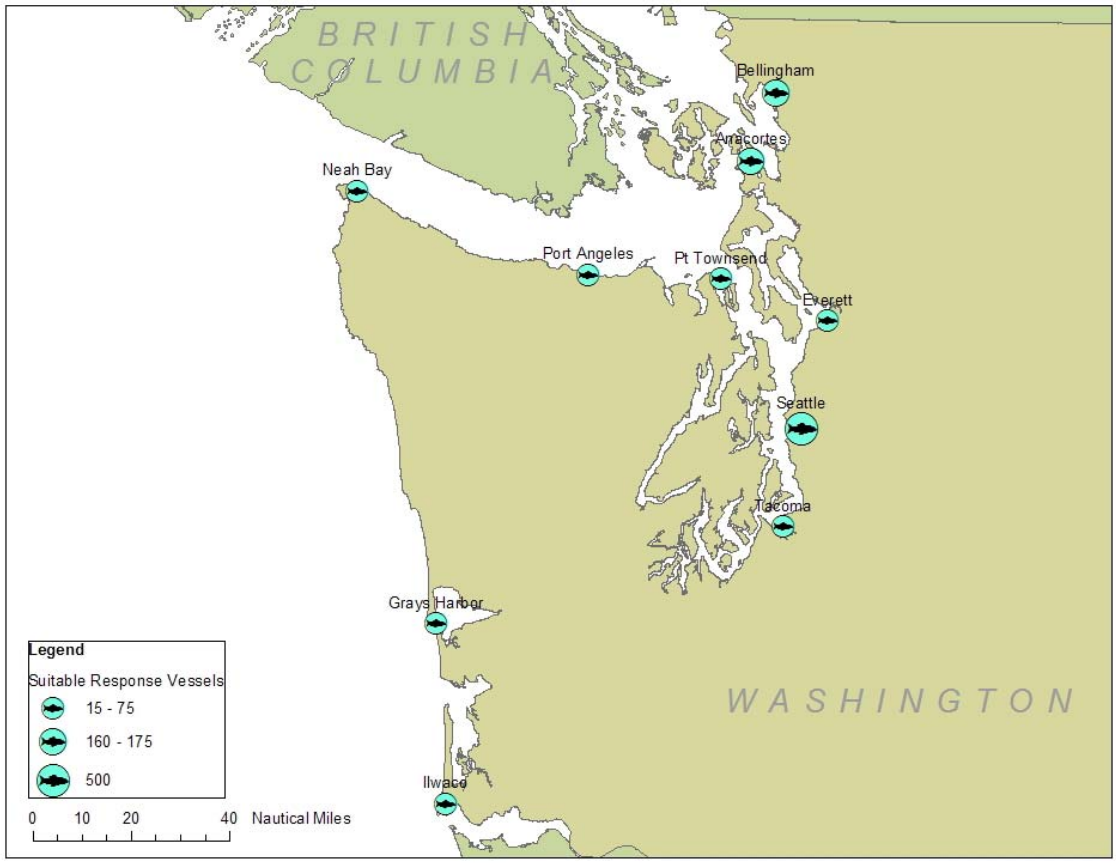

Figure 3-1: Location of homeports and number of local vessels suitable for spill/cleanup response

3.1.3.1 Local fleet

550 vessels of interest in local fleet

In an attempt to update the data from the 1999 report, port data were reviewed and contacts made with fishermen and others during June 2005. This effort resulted in a preliminary vessel count of 550 local vessels suitable for spill response.

A recent report (Pacific States Marine Fisheries Commission, 2004) included a count of vessels using catch landings data. This report serves as an indicator of overall fishing port activity. It provides a list of the major homeports in the state:

- Neah Bay, Port Angeles
- Westport, Grays Harbor
- Pt Townsend
- Willapa, Ilwaco
- Everett
- Anacortes
- Bellingham
- Tacoma
- Seattle

3.1.3.2 Distant water fleet

Natural Resources Consultants (1999) reported that at that time about 1160 distant water fleet vessels were home-ported in the Seattle area. Another 290 distant water vessels are moored outside the Seattle area and distributed throughout the marinas and private moorings in the state.

450 vessels of interest in distant water fleet

Current estimates by Natural Resources Consultants suggest that as of 2005, 450 vessels of the distant water fleet are suitable for spill response. Most of these have Seattle area home ports.

3.1.4 Fleet seasons

Local groundfish and crab seasons have been coordinated to attempt year-round employment. This results in multiple short seasons with frequent port calls on the west coast of Washington and north of Puget Sound.

Larger vessels are absent from homeports for longer periods

Slip vacancies at Fishermen's Terminal are an indicator of seasonal changes in fleet location (Figure 3 2). This is particularly true for the larger vessels of the distant water fleet because blocks of vacant slips indicate that a fishery is active.

Groundfish, salmon, herring, early crab and early tuna fisheries all operate between May and September. The slip vacancies indicate that 40-foot to 80-foot vessels in the distant water fleet have left the area during this period. Smaller vessels in the 30-foot to 40-foot range are less likely to leave for distant waters. These boats are more likely to work locally, if at all, and return often to their slips.

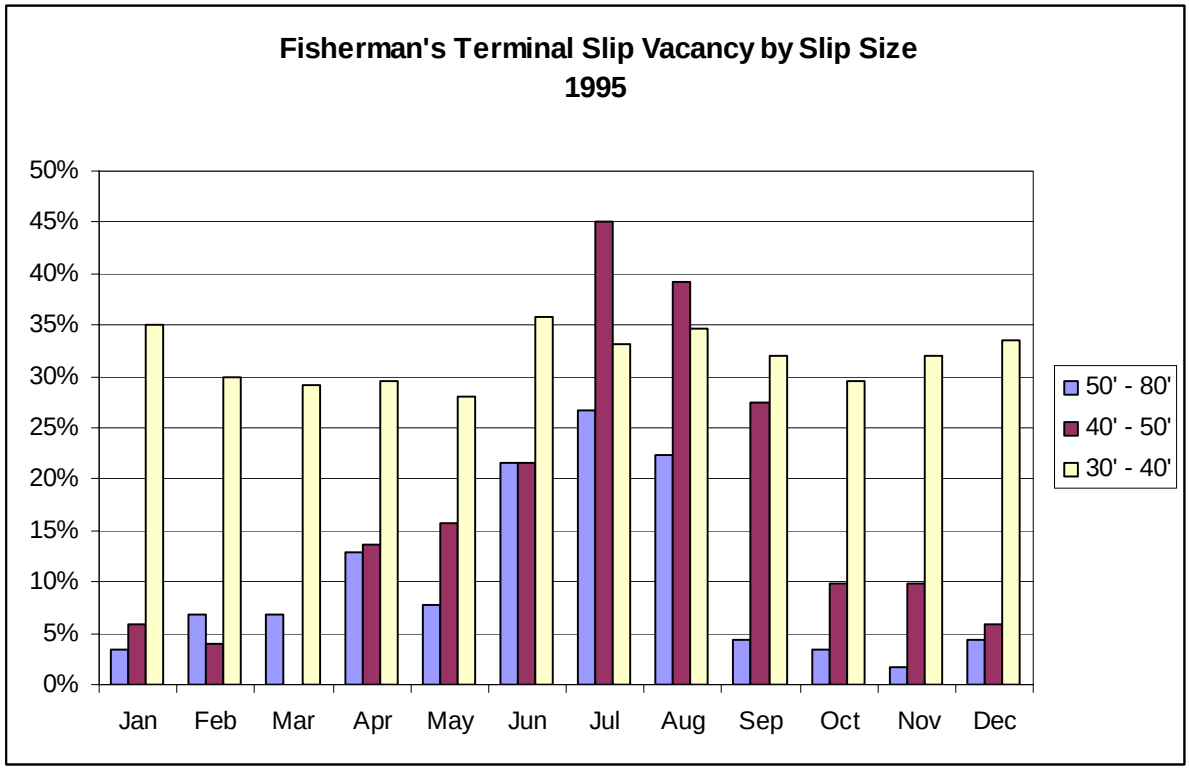

Figure 3 2: Vacancy rates at Fishermen's Terminal, 1995

While seasons vary significantly with the strength of fish stocks, a general guide to fishery seasons shows maximum activity from late spring to early fall. Many vessels will attempt to participate in secondary fisheries during the off season for their primary fishery.

Highest fleet activity August through October

The following figure shows the current seasons by vessel class. August through October is the heaviest period of utilization with the lowest availability for spill response as many seasons overlap. The calendar area in red shows this period of reduced fishing vessel availability.

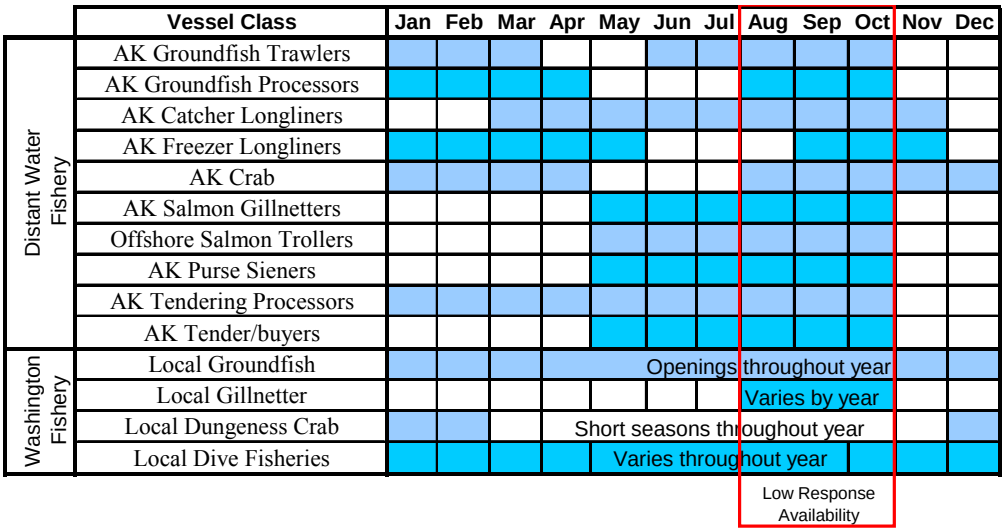

Figure 3-3: Typical seasons for the Washington based fisheries, showing 3 months when vessels are least likely to be available for response

A few vessels from each fishery may be found in port during the open season due to complications with marine systems, finances, permits or crewing. It cannot be assumed that vessels laid up during an active fishery will be available for spill or cleanup response.

3.2 Discussion of Vessel Suitability for Duty

Suitable fishing vessels share the primary characteristics of a utility vessel:

- Open deck space
- Lift gear
- Deck lights

Vessel type will determine their role, if any, in spill response

These general characteristics exclude longliners and trollers. Processors and trawlers are not ideal but could be used for specialized roles in a spill or cleanup response. Gillnetters are an exception to the open deck requirement because they can be used for boom maneuvering. The preferred candidates for spill and cleanup response include:

- Tender/buyers
- Alaska crabbers
- Purse seiners
- Local dive fishery boats
- Local gillnetters

The tender/buyer class vessels serve the utility needs of several fisheries and could readily shift to spill response activities. Tender/buyers vary widely in style. Large Alaska crabbers and purse seiners meet these requirements

without significant modifications. In most cases, unloading nets or crab gear is adequate to prepare for utility missions.

Figure 3-4: Purse seiner

Figure 3-5: Alaska crabber

Other considerations include availability and contamination issues

Vessels with permanent winches and net reels or enclosed decks are not ideal for oil spill response. While the goundfish catcher/trawlers could be an exception due to the large deck capacity for boom transport, it is unlikely that this fleet would participate in spill response because of their high utilization in the strong pollock/cod fishery.

A key concern in using any fishing vessels for spill control is the possibility of oil contamination of the fishing systems. After working in the spill zone, a thorough decontamination is required to return a fishing vessel to "food grade" fishing service. Decontamination of fish holds, live catch circulation systems or net/pot gear could be expensive and time consuming, and may be impossible.

It is inadvisable to use any vessel with large processing compartments and gear without prior preparation. Significant efforts to seal the processing spaces to avoid contamination by spill response gear or personnel would be required.

Two smaller classes that could be used in oil spill response are dive fishery boats and gillnetters. Dive fishery boats are commonly arranged in a utility configuration – that is, a large, uncluttered aft deck with lifting gear. Gillnetters are not suitable for transport of personnel or equipment because of the net gear that occupies much of their weather decks, but they might be used to tow and maneuver boom.

Figure 3-6: Puget Sound dive fishery boat

Figure 3-7: Puget Sound gillnetter

3.2.1 Recovery and containment

Crew training is a requirement, but does not guarantee success

Despite some evidence to the contrary from the *Prestige* spill, the fishing vessel of opportunity is not considered well suited to recovery and containment operations unless specialized crew training has been completed. Successful containment programs are characterized by rapid deployment of resources in the first several hours of an event, an activity that by its nature puts responders in the contaminated environment.

It may be feasible to use fishing vessels (particularly steel-hulled vessels) with trained crews for recovery and containment. A particular attempt at this failed, however, in 2001 at Neah Bay, with a fishing vessel on contract to an OSRO. The vessel was unable to respond to the satisfaction of State representatives to two consecutive drills. This failure culminated in the (temporary) loss of the OSRO's certification. Relying on fishing vessels, particularly vessels of opportunity, to perform containment and recovery work is highly uncertain.

3.2.2 Reverse containment (exclusionary and deflection booming)

Vessels of many types could participate in booming operations

Fishing vessels could provide excellent support in exclusionary and deflection booming outside the spill zone, provided that the vessel could carry adequate quantities of boom. Alaska crabbers and tender/buyers could be very effective in transporting large boom stockpiles to a spill location.

A number of fishery vessels could be effective in completing Geographic Response Plan protection strategies (GRPs) ahead of spill arrival. Any large vessel in a utility configuration (Alaska crabbers, purse seiners, tender/buyers) could transport boom and gear to GRP locations. Shallow draft, smaller vessels (gillnetters, dive fishery boats) could be effective in boom maneuvering, personnel transfer and gear transfer.

3.2.3 Enhanced skimming

Frequently, on-water mechanical recovery (skimming) can be improved by the use of assist vessels towing concentrating devices ahead of the skimming vessels – U-booms, Vee-booms or trawls that effectively funnel or concentrate the oil. Steel or aluminum gillnetters and dive fishery vessels could be used as boom towboats for enhanced skimming operations. This could be helpful in releasing smaller OSRV boom handling boats for more technical missions.

3.2.4 Equipment maintenance platforms

Maintenance support is also needed

A significant effort to maintain response equipment is required during large spills. This activity is frequently scheduled for accomplishment at night. Gear maintenance should be done by a dedicated crew other than clean-up

technicians, so that daily operations continue unabated. The Alaska fleet crabber and purse seiner are two vessel types that could be used as nightshift gear maintenance platforms. The tender/buyer is a third vessel type in the 40 to 100 foot range that could be ideal for gear maintenance. These three vessel classes have the following characteristics that would be helpful for nightshift equipment maintenance.

- Large open deck area (after removal of net and pot gear)
- Cranes and lifting gear
- Deck lights
- Accommodation for maintenance crews
- Tool/workshop spaces

Although these gear maintenance vessels would operate outside the spill, heavy deck contamination by incoming gear is likely. Contamination could be restricted to the working deck and gear maintenance areas for ease of decontamination. These vessels should be steel construction. Deck boards should be removed before the response or disposed of at the conclusion of the response. Fish holds must be sealed.

3.2.5 Shoreline cleanup assessment team (SCAT) platform

There is a role for smaller vessels in shoreline cleanup

Vessels of the local water dive fishery are well suited for transporting assessment teams. This vessel type could support a small team of surveyors outside the spill area for 12 hours at a time. It would serve as a transit and staging vessel for small boat surveys in inflatable boats or skiffs. Attractive features include:

- Shallow draft
- Low freeboard for boarding small boats
- Davits for recovering small boats
- Cabin space for assessment gear

Gillnetters may be suitable as well, as long as there is sufficient deck space for a decontamination station.

3.2.6 Logistics (supply) and reverse logistics (disposal)

Purse seiners, Alaska crabbers, tender/buyers and dive fishery vessels hold many of the requirements for supply and disposal. The primary requirements are open work decks, deck lights and lift gear.

3.2.7 Mob/Demob of response assets

Purse seiners, Alaska crabbers, tender/buyers and dive fishery vessels are well suited for mobilization and demobilization (transportation) of response assets. These are cargo style missions similar to the routine loading and unloading of catches.

3.2.8 Quarters vessels

Large processors have been used as quarters vessels for spill response personnel in remote locations. A large processor could accommodate 150 responders close to a cleanup site but outside the spill zone. They would have to be equipped with a decontamination station to ensure that critical process areas do not become contaminated.

3.3 Discussion of Vessel & Crew Certifications

Smaller fishing vessels are loosely regulated

Most of the vessels that have been identified in this program are smaller fishing industry vessels, less than 200 gross tons. Mandatory certifications for vessels falling into these classes are minimal, and cannot be relied upon as evidence of suitability for service in an oil spill response operation.

3.3.1 USCG documents & certifications

All of these vessels may carry USCG Certificates of Documentation. This is little more than a proof of ownership, similar to an automobile title. It implies no standard of suitability or seaworthiness.

Much of the expected gear list presented in Section 3.1.2 above derives from federal law. This is the only equipment mandate, and should be considered to be a bare minimum for vessels of opportunity.

3.3.2 State of Washington documents and certifications

The State of Washington will issue a vessel registration certificate and title upon presentation of proof of ownership and certificate of origin (and payment of fees). There are no standards for seaworthiness or equipage associated with registration or titling. Other Washington laws mandate minimum levels of only the most basic safety equipment, such as personal flotation devices and signaling devices.

3.3.3 OSHA documents and certifications for personnel engaged in hazardous waste cleanup

If vessel tasks qualify as "low-risk," 8-hour training may be appropriate

In its most basic form, OSHA regulations require that personnel engaged in hazardous waste cleanup operations and emergency response be certified as having completed prescribed training [29 CFR 1910.120]. Depending on the position of the individual, the training may consume 24 or 40 hours of classroom and field training, followed by at least a day of work under direct supervision. It is unlikely that any of the fishing vessel crews will possess certifications in Hazardous Waste Operations and Emergency Response (HAZWOPER).

The State of Washington, Department of Labor and Industries, has determined that many jobs associated with spill response may be classified as "low-risk." As a result WISHA prepared Regional Directive 32.99, which suggests an 8-hour training regimen for post-emergency oil spill response "low-risk" job tasks. While it is equally unlikely that any operators of vessels of opportunity have received this training, it represents a reasonable, achievable and practical level of training for vessel crews. The Regional Directive presents a very specific training regimen.

3.3.4 Crew licensing and certification

Aboard the majority of the vessels considered in this study, crew members may not be required to hold Coast Guard licenses. There is a unique grade under the USCG licensing system that applies to vessels being considered for this program: Master or Mate (Chief Engineer or Assistant Engineer) of uninspected fishing industry vessels [46 CFR 10.462]. It requires an examination and creditable service (experience) of up to four years. It applies to fishing industry vessels between 200 and 500 gross tons. There is no apparent requirement for licensing to operate a fishing vessel under 200 gross tons

3.3.5 Expected level of practical qualification

Because of the lack of prescriptive licensing for vessel operators, there can be no presumed level of competence. It is reasonable to expect, though, that the majority of the Washington State fishing fleet is operated by conscientious individuals with adequate vessel handling capability and experience.

3.4 Discussion of Vessel and Crew Vetting Standards

Standards must be established for vetting candidates

A recurring comment from the program coordinators for other vessel-of-opportunity programs is, "Be careful who is let into the program." The fairest way of doing this is to create a formal vetting program which establishes a minimum standard that all enrollees must meet. Because

mandatory standards for fishing vessel safety are somewhat fragmented between Coast Guard regulations, state regulations and the application of third party guidelines, a statewide program for spill response may require its own set of standards. The following discussion identifies resources that can be used as models in establishing the minimum requirements for ensuring that enrollees' operating practices and procedures deliver consistently high levels of quality and safety.

3.4.1 STCW

Some STCW 95 standards present good ideas for minimum qualifications

Fostered by the International Maritime Organization (IMO), the 1995 amendments to the International Convention on Standards of Training, Certification and Watchkeeping (STCW 95) contain both mandatory provisions and recommended guidance for ensuring the competence of seafarers. It enumerates the knowledge, understanding and proficiency expected of vessel crewmembers and prescribes the methods for demonstration of same. It is applicable to the officers and ratings aboard all vessels more than 500 gross tons.

While some of the vessel operators may hold Coast Guard licenses and current STCW certificates, the vast majority will likely not. Nonetheless, the guidelines it has established, particularly for training standards and for minimum rest periods, should be carefully considered for inclusion in any vetting standards.

3.4.2 ISM Code

ISM Code and AWO program are other possible sources for establishing vetting standards

The International Management Code for the Safe Operation of Ships and for Pollution Prevention ("International Safety Management Code" or "ISM") was brought into force by IMO, "to provide an international standard for the safe management and operation of ships and for pollution prevention." The value of the code is similar to that of ISO 9000 quality standards. It is not a prescriptive program, but rather a structure for evaluating risk, developing plans and procedures and validating their effectiveness by internal and external audits.

The ISM Code can be used as a guideline for any eventual vetting program because it outlines a concise framework for the establishment of policies and procedures to help ensure:

- Prevention of injury or loss of life
- Avoidance of damage to the environment
- Avoidance of damage to property

3.4.3 AWO responsible carriers program

The American Waterways Operators established the Responsible Carriers Program in 1994 as a code of practice for member companies. It is a formal

program "…intended to improve marine safety and environmental protection in the tugboat, towboat and barge industry … by establishing preferred industry operating principals and practices…." It is more prescriptive than ISM, and is focused on the US, providing direct citations of the Code of Federal Regulations (CFR) where they apply. It provides guidance on the management and administration of vessel operating companies, equipment and inspection standards and human factors. As with the ISM Code, it is identified here as a resource to be used when developing vetting criteria for vessels of opportunity.

3.4.4 North Pacific Fishing Vessel Owners Association

The North Pacific Fishing Vessel Owners Association publishes the *Vessel Safety Manual,* now in its fifth edition. It is a highly valuable resource that can be used when developing vetting standards, providing guidance on:

- Conducting Effective Drills
- Vessel Familiarity
- Medical Emergencies at Sea
- Watchkeeping
- Fire Prevention and Control
- Seamanship & Nomenclature
- 46 CFR Part 28 - Commercial F/V Regs.
- Stability and Damage Control
- Coast Guard Procedures
- Rules of the Road
- Safety Equipment & Survival Procedures
- Working Conditions
- Common Vessel Safety Concerns
- Vessel Systems

The group also publishes the OSHA Compliance Guide for Fishing Vessels, which includes sections on:

- Checklists on standards and general requirements to assist in identifying non-compliance
- Record-keeping and posting information
- Tips for preparing for and conducting OSHA inspections
- Most common industry citations - penalty information
- Accident investigation forms and instruction
- OSHA Resource List

3.4.5 Insurance standards & responder immunity

[Disclaimer: Legal interpretations are outside of the scope of this report. The discussion that follows is academic in nature and not intended to be legal advice.]

Vessels may not have insurance

Unlike motor vehicles, vessels in Washington State are not required to have insurance. As a result, there is no minimum insurance that can be assumed to be in force on any vessel of opportunity. Interviews with boat owners confirmed a wide variation in the level of insurance coverage in place.

A well-insured vessel will have a hull and machinery policy (the equivalent of automobile collision and comprehensive coverage) and be enrolled in a Protection & Indemnity (P&I) program (the equivalent of automobile liability coverage). P&I can be in the form of an outright insurance policy or a mutual indemnification "club." What may be referred to in shoreside industries as Workers Compensation coverage is included in P&I. For vessels in sporadic service, crew coverage under P&I may be structured on a month-to-month premium basis, charged only when the owner declares the risk with his insurer or mutual indemnity club.

Coverage for industrial workers carried but not employed by the vessel may not be included in P&I. It would be reasonable for a fishing vessel owner and his insurer to require that spill workers assigned to his vessel are covered under their employer's Longshore & Harbor Workers (L&H) insurance program.

Limited immunity is possible for responders

The Oil Pollution Act of 1990 ("OPA '90") amended the Federal Water Pollution Control Act to provide limited immunity to responders, when acting in accordance with the National Contingency Plan.

"(4) EXEMPTION FROM LIABILITY.

"(A) A person is not liable for removal costs or damages which result from actions taken or omitted to be taken in the course of rendering care, assistance, or advice consistent with the National Contingency Plan or as otherwise directed by the President.

"(B) Subparagraph (A) does not apply,

"(i) to a responsible party;

"(ii) to a response under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 U.S.C. 9601 et seq.);

"(iii) with respect to personal injury or wrongful death; or

"(iv) if the person is grossly negligent or engages in willful misconduct.

"(C) A responsible party is liable for any removal costs and damages that another person is relieved of under subparagraph (A)."

A cursory search of the Washington Administrative Code and the Revised Code of Washington turned up no references that modified the federal law. It would appear that a vessel of opportunity, operating under the guidance or direction of the unified command, would be eligible for the exemption.

3.5 Discussion of Commercial Issues Affecting the Availability of Vessels of Opportunity

3.5.1 Working with "affinity groups" rather than individual vessel owners

A dedicated coordinator is a feature of successful fishing vessel programs

In the discussions presented in Section 4 regarding OSRO fishing vessel programs, there are several recurring themes. One theme lends anecdotal evidence to the perception that dealing with individual vessel owners is too difficult – particularly during a spill. In all examples where vessel-of-opportunity (fishing vessel) programs have worked effectively, a dedicated coordinator has been engaged. In some instances, that coordinator is on the staff of the response organization. In other instances, it is staffed by a group representing the vessel owners.

The following associations have been identified as "affinity groups" of fishing vessel owners. Several may be candidates to represent a conduit for information flow and coordination with vessel owners.

- Alaska Crab Coalition
- Alaska Independent Fishermen's Association
- At-Sea Processors Association
- Bering Sea Fishermen's Association
- Bristol Bay Driftnetters Association
- North Pacific Fishing Vessel Owners' Association
- North Pacific Longline Association
- Pacific Seafood Processors Association
- Purse Seine Vessel Owners Association
- Puget Sound Marketing Association
- United Catcher Boats

Tribal organizations may represent appropriate affinity groups also. Three were identified during Glosten's work with the Coast Guard Tug Deployment Decision Matrix project in 2004:

- Lummi Nation, Bellingham
- Makah Tribe, Neah Bay
- Tulalip Tribe, Marysville

Tribal fishing resources may actually overlay many of the groups listed above. During this study, it was felt that engaging any of these groups in

discussions of potential vessel-of-opportunity programs would be more rewarding at a later time, once the drivers, goals and objectives of the program were better defined.

3.5.2 Reasonable response timeline criteria

Program must recognize 12-hour minimum response time

For the owner of a fishing vessel, getting underway out of season may be a time-consuming task. It is unreasonable to assume that any vessel in the fishing fleet can meet the response criteria established for response organizations: *get underway inside of 2 or 4 hours if asked to do so*. The major obstacles are crewing, bunkering and provisioning. However, there is evidence from candid conversations with vessel owners that a significant portion of them could get underway within 12 hours. It is suggested that any fishing vessel program consider 12 hours as a target planning standard, and that it be clearly communicated to potential participants.

3.5.3 Insurance coverage

As mentioned above, there is no mandatory insurance coverage (or other means of demonstrating financial responsibility) for fishing vessels. As part of any vetting program, minimum standards for insurance coverage, or provisions for covering vessels of opportunity under a program "umbrella" must be developed.

Insurance and cash flow issues must be addressed in vessel-of-opportunity program

3.5.4 Cash flow

Any fishing vessel program must recognize that the average commercial fisherman cannot support "net 30 days" payment terms for services. Special funding must be established to provide fast settlement of invoices or even operating advances to responding vessels. They will need the cash to be able to bankroll their operation and buy their own consumables.

SECTION 4

Responder Interviews

Response organizations within Washington State and around the world were queried about their existing vessel of opportunity management programs. Telephone interviews conducted in June 2005 elicited candid responses. Existing fishing vessel programs were found to vary widely in formality, funding and apparent effectiveness. However, two common themes emerged: the need for a dedicated program coordinator representing a stable, long-term program organization, and the necessity of including only the "right" vessels and crews. A tabular presentation of the interview results is included in Table 4-1 at the end of this section.

4.1 Summary View – Regional

As part of the OSRV Capabilities Study, The Glosten Associates interviewed primary response contractors and oil spill response cooperatives in the Northwest Region. We asked these organizations to differentiate between their involvement with commercial vessels under pre-placed contracts and community-based affinity groups such as those affiliated with a local fishery. The vessel of opportunity pictures that emerged from these interviews are location-specific, with their success rooted in community awareness and the nature of the local economy. A summary of the regional organizations interviewed for this study is listed below.

It should be noted and appreciated that many of the groups interviewed in the region offered to host representatives of the Department of Ecology and share additional information on their vessel-of-opportunity programs.

4.1.1 Burrard Clean Operations

BCO fishermen's program is highly developed

Headquartered in suburban Vancouver, the oil spill response cooperative Burrard Clean Operations (BCO) covers the British Columbia coast from the Washington State border to Alaska. BCO maintains a well-organized vessel of opportunity program known as the Fishermen's Oil Spill Emergency Team (FOSET). At interview time, BCO had 107 fishing vessels enrolled in the FOSET program.

Burrard Clean Operations manager, Craig Dougans, characterized the FOSET group as: "good boats, good local knowledge and very self-reliant." He was quick to point out that the program's success was directly related to the involvement of six area coordinators and to local economies where multiple jobs are a way of life. Although the area coordinators are paid no retainer, there has historically been sufficient equipment maintenance or program administrative work to provide them with the equivalent of part time employment. Successful area coordinators must have a reputation for fairness within their community and must exhibit sensitivity toward the different fishing fleets that often compete against each other for the harvest of a shrinking resource.

The following points highlight the FOSET program:

- The FOSET Program Goal: "To involve the fishing community in BCO's oil spill response capability along the BC coastline by providing oil spill training and contracting fishing vessels on an as-needed, when-available basis."
- A strong preference for enrolling metal-hulled vessels in the program, although some fiberglass vessels are accepted. Decontamination concerns prohibit the use of wood boats.
- Participants receive the equivalent of two days compensated training per year but no other remuneration is paid unless the vessel is specifically dispatched by BCO for a spill response, a drill or a maintenance activity.
- BCO maintains all training records for the FOSET fleet. While there is no HAZWOPER equivalent in Canada, BCO must train FOSET personnel in compliance with both provincial workers compensation regulations and those of the Canada Shipping Act.
- Vessels are tracked either by owner or by skipper but generally not by crewmembers. It is the participant vessel's responsibility to report for assignment with a full BCO-trained crew. Vessels who report in a deficient condition are withdrawn from the response effort and consequently do not get paid.
- Due to the area coordinators' intimate local knowledge, few program participants are contacted for a dispatch they will be unable to accept or for which they will arrive in a deficient state.
- Prior to participating in a response, the vessel's fish hold is sealed. Recovered oil is never allowed aboard a FOSET vessel. Cross deck transfer of recovered oil from over-the-side skimmers to temporary storage is allowed.
- FOSET vessels typically engage in enhanced skimming operations or logistical support.

The FOSET program has been in operation since 1993. While the long-term involvement of the same area coordinators has clearly facilitated its stability, Craig Dougans credits the FOSET membership's deep sense of community as the only real reward for their participation.

4.1.2 Clean Rivers Cooperative

For planning purposes, Clean Rivers Cooperative provides its 21 members with oil spill response coverage along the Columbia and Willamette Rivers from the I-5 bridge westward to 3 miles offshore. The cooperative owns a substantial amount of equipment but contracts with Cowlitz Clean Sweep (CCS) to operate that equipment.

In addition to membership incidents, Clean Rivers responds to spills from vessels enrolled in the Maritime Fire and Safety Association's (MFSA) umbrella contingency plan. Enrollment under the MFSA umbrella fulfills both Oregon and Washington laws that require all vessels over 300 gross tons to have their own state approved oil spill contingency plans.

Speaking on behalf of Clean Rivers, Brent Way, the co-op manager, stated that a vessel of opportunity program has never proven necessary for his organization to sponsor. Recently, Cowlitz Clean Sweep initiated an involvement with fishermen in the Longview area. Four fishermen have worked with CCS to train on Clean Rivers' equipment, although not while incorporating their own fishing boats. Clean Rivers *may* be open to future opportunities to supplement their response efforts through the use of the fishermen's own boats. Clean Rivers pays CCS under their general operating contract but not separately for a specific fisherman's recruitment.

4.1.3 Cowlitz Clean Sweep

Cowlitz Clean Sweep (CCS) is an industrial cleaning company with certification as an oil spill primary response contractor. They function as the "obligated to respond" service provider operating all of the Clean Rivers Cooperative equipment. Additionally, CCS participates in the Marine Spill Response Corporation's (MSRC) Spill Team Area Responders (STAR) program.

CCS does not have a formal vessel of opportunity program with any affinity group but it does have pre-placed subcontractor agreements with commercial vessels. Recently, Bob Matson, the emergency response manager, hired four Longview gillnet fishermen as part-time on-call employees to support the Clean River contract. This arrangement does not constitute a formal program. The fishermen had a prior association with the company and were further recruited because of their practical experience and intimate knowledge of the lower Columbia River.

As Mr. Matson explained, "These guys are water people and very rarely do we get any boat or water people here without extensively training them. These guys took to towing boom and setting boom like a duck takes to water." On a weekly rotational basis, two individuals are paid a stipend to be on-call for the Clean Rivers contract. Compensation for training is paid at a reduced rate with spill responses paid at the full rate. HAZWOPER training is done to the 24-hour level.

The fishermen do not respond with their own vessels. Cowlitz Clean Sweep indicated that they would need to take a hard look at insurance and liability issues before considering that level of involvement.

4.1.4 Global Diving & Salvage

GDS focuses on identifying commercial resources

Global Diving & Salvage (GDS) is a "for profit", privately held Washington State approved primary response contractor. In addition to providing commercial diving services, GDS provides marine construction, ship husbandry and oil spill response.

Only a finite number of suitable commercial vessels are available

According to Devon Grennan, Global's general manager, the company maintains a broad list of commercial vessels of opportunity for hire. None of the vessels are dedicated to oil spill response and each could also serve a variety of marine contracting needs. Devon noted that there are only a finite number of suitable commercial vessels available in Puget Sound and everybody within the response community competes for those resources during a spill of any significance. From the private contractor's perspective, there is insufficient money in spill response to justify the allocation of time and funds toward maintaining an in-house vessel of opportunity program.

4.1.5 Islands' Oil Spill Association

IOSA is a benchmark for organized community-based first response

The Islands' Oil Spill Association (IOSA) is a Washington State Approved Primary Response Contractor (PRC). In their own words, "IOSA is a community based private nonprofit organization providing training, prompt first response for oil spills, shoreline protection, wildlife rescue, and spill cleanup in the San Juan Islands." The organization was established in 1988 upon the realization that outside assistance to marine oils spills would be tragically late in arriving to the remote San Juan Islands. Since its founding, IOSA has responded to 331 oil spills in San Juan County. Largely self-taught and self-funded, IOSA has evolved from a small association of community activists to the benchmark for a community-based response organization. Their membership unites many diverse people within the island community in the common goal of protecting the San Juans from a marine oil spill.

At the present time, IOSA has 170 personnel trained as oil spill responders. These individuals receive no compensation for training but will earn IOSA wages when dispatched on a spill response. The organization owns

containment boom, skimmers and a few small response vessels. Additionally, there are 26 privately-owned commercial vessels within the ranks of the IOSA responders. These vessels routinely train and respond to spills on IOSA's behalf.

The following points summarize IOSA's use of community vessels of opportunity:

- Vessels of opportunity are recruited through drills and IOSA responder training. The relationship is first developed with the individual whose initial IOSA participation is as spill response labor. As the group becomes familiar with that individual's skill set, IOSA may express an interest in using that person's private vessel in response training.
- In general, only commercial vessels participate in the IOSA program.
- Unlike some programs, IOSA will use vessels of opportunity for recovery, storing recovered oil in drums or basins staged aboard the vessels.
- IOSA responders are HAZWOPER trained to a minimum of 24 hours, with many people trained to the 40-hour level and beyond. IOSA is responsible for training and record keeping.

IOSA's director, Julie Knight, offered the following observations for any group trying to establish its own vessel of opportunity program:

1) Before announcing a formal program, first survey the local community to identify the mix of vessels potentially available for spill response.
2) A stable organization with experience, credibility and local contacts must pre-exist to provide long-term continuity for "the program."
3) One of the program's guiding principles should be "don't compete with existing spill response contractors and co-ops; instead convince the leaders of those organizations that the program will be helpful to them."
4) There must be a variety of experienced commercial or semi-commercial operators who work for marine-based businesses…people who are good at and enjoy this type of work…and who see that the leaders of existing spill response agencies and organizations believe their participation in this program will be useful. Enroll only self-reliant individuals with practical knowledge of on-water work. Recreational vessels should be avoided.
5) Participants must be willing to make time for training to develop good working relationships between themselves and the program coordinators. The program needs enough training sessions so that coordinators will know each participant's personal and professional qualifications.

Don't compete with existing spill response contractors

6) For program longevity, participants need to have a strong desire to care for their community, to provide a degree of self-sufficiency for their community and to protect and improve the health of the ocean.
7) Participants should be paid for spill response work. If there is some rare situation that does not allow this, they should at least have their expenses reimbursed.

IOSA indicated the importance of a sense of community as the primary motivation to participate in a program. No profit exists in community oil spill response activity; consequently the incentive for participation relies heavily on the value people place on the area in which they live.

4.1.6 MSRC – Northwest Region and Clean Sound

MSRC's fishing vessel program relies on a periodic mail survey for tracking

The Marine Spill Response Corporation (MSRC) is a not-for-profit industry-affiliated organization, funded by members of the Marine Preservation Association. MSRC's Northwest Region acquired Clean Sound Cooperative in April 2005. This newly-merged organization now controls the majority of open water spill response assets in the region, potentially making them an influential player in the vessel of opportunity market. Barry Kevan, MSRC's Northwest Region response manager, spoke at length on their vessel of opportunity program, starting with a historical review of MSRC's ever-evolving mission.

It is important to note that in the era immediately following the *Exxon Valdez* grounding, MSRC's mission was to respond to the catastrophic oil spill in an ocean environment. Since that time, the mission has evolved to one geared toward smaller incidents in shallower waters. Additionally, in response to member requests, their mission has broadened so dramatically that they have even looked at providing mobile response packages to member facilities far inland from coastal waters.

Since their 1990 establishment, MSRC has undergone at least two major realignments, in 1995 and 1996. During the well-funded years prior to the 1995, MSRC enrolled up to 600 fishing vessels in a formal program that stretched from Crescent City, California, to Blaine, Washington. Fishing vessel crewmembers were trained to the 24-hour HAZWOPER standard and deployment exercises were conducted on a regular basis. Two area coordinators, one for Oregon and one for Washington, managed this program.

Today's fishing vessel program is substantially pared down from that of the early days. The pool has contracted to 150 vessels distributed over the same geographic area. Two subcontractors track these vessels through a database that is updated by mailer every two years. HAZWOPER training is no longer routinely offered and available funding has limited paid participation in deployment exercises and drills.

While this status may be disappointing, there are compelling reasons for the evolution. Those reasons and the compensating resources were summarized as follows:

Fishing vessel crews are a highly mobile workforce

- Investments made in training fishing vessel crews did not provide a return. Fishing vessel crews are a highly mobile – almost migrant – workforce, easily dispersed by market forces. It was impossible to rely on them as a source of HAZWOPERs.
- Federal fishing vessel and permit buyout programs substantially diminished the Northwest fleet. Many of the remaining non-tribal boats home ported in the Northwest follow seasonal distant water fisheries in Alaska and beyond.
- In seeking to stabilize the supply of vessels of opportunity, MSRC shifted their focus away from fishing vessels in favor of commercial vessels. The relationship now takes the form of pre-placed contracts with service providers who offer vessels on a turnkey basis staffed by appropriately trained crews. Many of these vessels are owned by contractors participating in MSRC's Spill Team Area Responders (STARS) program. This has effectively removed MSRC from administering any formal vessel of opportunity program involving the fishing fleet. The one limited exception is at Neah Bay where MSRC maintains a response relationship with the Makah tribe.

In the future, MSRC may review the potential role fishing vessels could play in a response. The MSRC experience with the fishing fleet in the early 90s verified the fishermen's ability to deploy response equipment and to understand local environmental conditions. MSRC sees value in engaging fishing vessels for enhanced skimming operations, GRP deployment and logistical support.

4.1.7 National Response Corporation – Northwest Region

NRC's experience at Neah Bay, Astoria and Eureka

The National Response Corporation (NRC), through its subsidiary NRC Environmental Services, is a certified Washington State Primary Response Contractor. NRC is wholly owned by Seacor, a publicly traded, for-profit company. NRC maintains pre-placed contracts with commercial vessels for supplemental oil spill response assistance. In addition, NRC has engaged some creative alternative sources of manpower outside the Puget Sound region.

Like MSRC, NRC has had a relationship with the Makah tribe's Neah Bay-based response group since 1996. Group enrollment has fluctuated over time but it is reasonable to state that between NRC and MSRC, a core of 10 individuals has consistently participated in biannual deployment training. In the relationship's early stage, some Makah-owned fishing vessels were paid

retainers to participate in the program. However, prompted by a 2001 agreement with the State, NRC has since replaced those fishing vessels with its own large response vessel stationed at Neah Bay. Local vessels are no longer paid to participate in the program.

While Neah Bay may fit the academic profile of a community ripe for a vessel of opportunity program, NRC has found it to be a challenge. First, the best vessels are usually engaged in a fishery that fills their working decks with gear. This gear typically must be removed prior to a spill response effort. The second issue deals with the funding necessary to make it worthwhile for community members to remain involved in a spill response program on a long-term basis. Payment of standby compensation is beyond the level a private contractor can justify.

With respect to supplemental manpower, NRC has had a successful relationship with the Tongue Point Job Corps Center Seamanship Training Program in Astoria, Oregon. Through this affiliation, NRC provides paid 24-hour level OSHA training as a student elective. In the event of an actual deployment, students receive "on-the-job" training credit from the Job Corps Center and are paid as spill response laborers by NRC. Over the past 10 years, NRC believes they have trained upwards of 600 students through this arrangement. While the Job Corps Center owns several training vessels, none are suitable as supplemental vessels of opportunity.

In the Eureka, California area in 1999, NRC trained a group of local people as first responders. The group's composition spanned many walks of life lending validation to the suggestion that community-based response groups do best in areas where a living is earned from many jobs. During this group's most active years, some boat owning members were even able to use their vessels in training with NRC.

While NRC acknowledged the value community-based affinity groups could play in a spill of significance, they tempered their enthusiasm by citing the funding and membership stability requirements necessary to make a group successful. NRC also saw integration of "casual spill responders" into the Incident Command structure as potentially challenging.

4.1.8 13th Coast Guard District Response Advisory Team

DRAT focuses on larger vessels to host VOSS

Mr. Scott Knutson with the 13th Coast Guard District Response Advisory Team (DRAT) indicated that the Coast Guard maintains interagency response agreements with a variety of government vessels to host its vessel of opportunity skimming systems (VOSS). The scale of the DRAT equipment is such that their ideal vessel of opportunity profile lies in the 300' to 350' length range. While these requirements exceed the range of readily available commercial vessels, Mr. Knutson felt smaller vessels of opportunity, such as

fishing vessels, could fill a potential gap in spill response by working with OSRO skimming vessels in enhanced mode. Sizeable inventories of containment boom are staged in the Pacific Northwest, but there may be an insufficient number of vessels to deploy and tend the huge quantity of boom that will be used in a significant spill. Likewise, vessels of opportunity trained in enhanced skimming could make a beneficial contribution by freeing for other duties those OSRO vessels previously dedicated to that task.

4.2 Summary View – Extraregional

Like Northwest spill response organizations, most out-of-region entities maintain pre-placed contracts with commercial vessels of opportunity. There also exist programs within the Alaska cooperatives that are devoted to fishing vessels. The most often cited fishing vessel program belongs to Ship Escort Response Vessel System (SERVS), the cooperative covering the greater Prince William Sound area. The following paragraphs summarize interviews conducted with the out-of-region organizations.

It should be noted and appreciated that many of the extraregional groups interviewed offered to host representatives of the Department of Ecology and share additional information on their fishing vessel programs.

4.2.1 Alaska Clean Seas

The oil spill cooperative Alaska Clean Seas (ACS) covers the area immediately surrounding the Prudhoe Bay oil fields plus a narrow territorial band following the Trans-Alaska Pipeline southward 165 miles from its origin. Only two settlements, the Inupiat communities of Barrow and Kaktovik, exist within the ACS area of interest. Native-owned aluminum and sealskin whaleboats are common in this area but only two private vessels have been identified as vessels of opportunity suitable for spill response.

The territory served by ACS is flat and frozen nine months out of the year. Because of the climate, there is a low risk of an oil spill directly contacting open water. Cleanup activities typically involve the use of heavy equipment. According to ACS, the last major open water release occurred in 1979.

With regard to spill response capabilities, Alaska Clean Seas relies on 350 trained Alyeska and North Slope contract personnel to staff the first 72-hours of a response. Thereafter, ACS will cascade the Barrow village response team and 400 Anchorage based personnel to relieve the first responders.

4.2.2 Cook Inlet Spill Prevention and Response, Inc.

100 vessels in CISPRI vessel of opportunity pool

Commonly known as CISPRI, Cook Inlet Spill Prevention and Response, Inc. maintains approximately 100 vessels in a vessel of opportunity pool. While the majority of participating vessels come from the fishing fleet, CISPRI tries to increase the program's utility by enrolling a mix of other commercial vessels such as landing craft and large steel hulled vessels that are suitable for working in the seasonal Cook Inlet ice. A subcontracted coordinator from within the fishing community manages the CISPRI program.

Vessels are paid for training, drills and actual responses but retainers are not paid for program affiliation. Insurance coverage is the responsibility of the vessel and is stipulated in the program contract. In the event of a significant spill response, CISPRI would make the necessary arrangements to extend vessel coverage under the cooperative's policy.

CISPRI provides HAZWOPER training to program vessels. Within the Cook Inlet area, HAZWOPER-trained personnel are in short supply. CISPRI has an understanding with program participants that during a response, crews of vessels not dispatched can be reassigned to other boats or to beach cleanup operations.

4.2.3 Mariners' Oil Spill Team (Clean Coastal Waters)

A program initiated and managed by fishermen

The Mariners' Oil Spill Team is a commercial fishermen's response group based in the Los Angeles metropolitan area. The program is administered through the Los Angeles Commercial Fishermen's Association. It has had a long-term relationship first with the Clean Coastal Waters cooperative and thereafter with its successor, MSRC. Enrollment is composed of approximately 40 vessels from the local commercial and charter boat fishing fleet. Many of these commercial fishermen are third and fourth generation watermen. The vessels range in size from 20' to 105'.

MSRC annually provides 8 hours of classroom training to the team. Fishermen receive no compensation for attending this training. The program itself receives no funding from the State of California. Training records are maintained by the Mariner's Oil Spill Team office. A third party marine surveyor is used to conduct a topside survey of vessels seeking admission to the program. Participating vessels are categorized according to their ability to support: *vessel of opportunity skimming systems* (VOSS), boom towing and logistics.

4.2.4 Oil Spill Response Limited

OSRL is prepared to use "true" vessels of opportunity worldwide

Mike LaTorre, an MSRC executive on loan to Oil Spill Response Limited (OSRL), courteously replied to an inquiry about OSRL's vessel of opportunity use. OSRL, one of the world's largest oil spill response organizations, is wholly owned by 29 member oil companies. Their mission is to provide response resources to member spills on a global basis. OSRL maintains an equipment base in Southampton, UK, and an affiliated depot in Singapore. Their strategy focuses on flyaway or over-the-road packages that can be used to supplement the response assets of individual members.

Like MSRC, OSRL's *vessel of opportunity skimming systems* (VOSS) are large and bulky, typically requiring a vessel in excess of 75'. Because of OSRL's worldwide response area, the staff trains to be able to install the VOSS on vessels that may have never previously worked in spill response. Prior to dispatching a VOSS from the equipment base, an on-scene person will have vetted local vessels of opportunity to identify a compatible host. Once installed aboard that host vessel, an OSRL staff member would remain to provide "on-the-job" training and supervision. It should be noted that within the international community, health and safety awareness varies widely. OSRL may be required to provide some equivalent level of HAZWOPER training, prior to beginning recovery operations.

According to Mr. LaTorre, it is critical that a local person assesses crew competency as much as vessel suitability. The fully deployed VOSS includes boom for enhanced skimming and towed bladders for temporary storage. The bulk of that assembly, in combination with rising seas and deteriorating weather, can quickly overwhelm a vessel of inadequate size or one staffed by substandard crew.

4.2.5 Ship Escort Response Vessel Systems

SERVS has the most sophisticated program

The mission of the Ship Escort Response Vessel System, or SERVS, is "to prevent spills by assisting tankers in safe navigation through Prince William Sound and to protect the environment by providing effective response services to the Valdez Marine Terminal and Alaska Crude Oil Shippers in accordance with oil spill response agreements and plans." This super-sized Alaskan regional cooperative administers a highly structured vessel-of-opportunity program with an enrollment of 395 fishing and specialty vessels. Alyeska Pipeline funds SERVS, as part of its cost of doing business in Prince William Sound. That corporate philosophy was first enabled by the *Exxon Valdez* oil spill and later mandated under Section 5005 of the Oil Pollution Act of 1990.

To summarize the many facets of this benchmark program, it is expedient to divide the program into its root constituents: organization, vessels, and training policy.

4.2.5.1 Organization

Extending beyond the physical boundaries of Prince William Sound, the program is organized by the seven geographic areas of Chenega Bay, Cordova, Homer, Kodiak, Seward, Valdez and Whittier. The Fishing Vessel Program Coordinator has overall responsibility for the program. Seven local Fishing Vessel Administrators report to the program coordinator. The local administrators, who are always on-call, must appoint alternates to relieve them during times when they are unavailable. The fishing vessel administrators are not SERVS employees but independent contractors who have won multi-year contracts for their positions.

To meet the Prince William Sound planning standards, enrolled boats are first organized by response tiers. In an actual response, those tiered vessels may fill pre-assigned duties according to oil spill Incident Command System (ICS) functions. The sixty-two Tier 1 vessels are the most intensively trained boats. They are typically designated for open water operations such as working with the larger SERVS skimming vessels like the *Valdez Star*. In anticipation of encountering unweathered crude oil during recovery operations, Tier 1 crewmembers are issued and fit-tested for respirators, and are trained in the use of air monitoring instruments. Tier 1 vessels are held to a 6-hour response time. During the winter, they receive $335 per month to cover the added readiness costs of electricity for engine block heating and snow removal.

Boats belonging in the Tier 2 group are typically considered to be near shore response assets. Like the Tier 1 vessels, Tier 2 vessels receive 24-hour annual HAZWOPER training and undergo deployment drills once per year.

There also exists within the fishing vessel program a less structured category called Tier 3 vessels. These are true vessels of opportunity, uncontracted and untrained, whose status is monitored by a contract service provider. In the event of a major response, it is the Tier 3 contractor's responsibility to activate these vessels through a call center, train them and dispatch them as directed by the response organization. SERVS periodically audits the Tier 3 program for evidence of performance.

4.2.5.2 Vessels

The SERVS fishing vessel program is reflective of local fishery conditions. For example, at one time, the program composition was 75% seine boats, 55' in length. Now, 55% of the program boats are bowpickers with an average length of 28'. Within the bowpicker fleet, 41% are gasoline powered, forcing SERVS to modify their logistics plans for refueling those boats. Specific response tactics were also adjusted to utilize the smaller vessels. In addition to fishing vessels, the program enrolls a variety of specialty vessels such as tenders, freight vessels and power scows. Most of the specialty boats are intended for logistical support activities.

Local program administrators are the primary vessel recruiters. Their intimate community knowledge serves as the first line of judgment in populating the program with quality vessels. Marine surveyors are also used to independently assess the condition of candidate vessels. No hard and fast rules exist regarding the enrollment of either wood or fiberglass boats; rather a vessel's overall physical condition factors heavily into the admission decision. Contracts are executed only with vessel owners and not with operators of leased boats. Secondary recruitment avenues include outreach efforts during trade shows, research in the state vessel registry and examination of harbormaster moorage rolls for vessels whose physical characteristics seem "right" for the program.

Vessels and personnel are compensated at a reduced rate for training. In the event of dispatch to an actual spill, that payment will substantially increase. Vessels maintain their own insurance unless dispatched to a spill at which time they will acquire coverage through Alyeska. Deductibles and negligence provisions still apply while under the Alyeska umbrella.

4.2.5.3 Training

Although various training opportunities exist within the fishing vessel program, four levels of basic HAZWOPER compliant courses form the core curriculum:

- Level 1. Eight-hour training for low risk activities such as logistic support and personnel shuttle.
- Level 2. Sixteen-hour training for clearance to work in areas where spilled oil *may* be encountered.
- Level 3. Twenty-four-hour marine HAZWOPER training for first responder activities within the area of spilled oil.
- Level 4. Training for those individuals involved with wildlife hazing, capture and transport.

To be first-responder qualified, attendance is mandatory at an annual 24-hour marine HAZWOPER course. The ubiquitous annual 8-hour refresher course, long acknowledged as the industry standard, is no longer accepted by SERVS. This policy change was partially driven by the difficulty of tracking compliance among a fluid labor force. The policy is now simplified such that all first response personnel must annually attend the 24-hour course. Personnel are paid to attend training courses and courses are offered at multiple locations on a periodic basis. The program is also working to facilitate participation in on-line HAZWOPER courses for those individuals prevented by some unusual circumstance from attending the annual required SERVS course.

4.2.5.4 Conclusion

SERVS operates in a unique homogeneous environment both from an accountability standpoint and by community characteristics. Like other successful vessel of opportunity programs, the success of the SERVS' program is tied to:

- Area coordinators from within the communities they serve.
- Standards for vetting candidate vessels.
- Consistent training opportunities.
- A community environment where participation in the program is both a financial reward and a civic duty.

4.2.6 Southeast Alaska Petroleum Resource Organization

A less formal program for vessels

SEAPRO or the Southeast Alaska Petroleum Resource Organization is a cooperative non-profit oil spill response organization that serves 36 member companies across Southeast Alaska. The co-op has 33,000 miles of shoreline within its area of interest, but only 27 communities. A lean professional staff acts as SEAPRO's spill management team while approximately 284 Response Team members – those who physically respond to spills – are organized according to nine regional zones. For comparison purposes, response teams are analogous to volunteer fire departments. Team members receive no compensation for training but do become paid employees of SEAPRO when dispatched to a response. SEAPRO provides HAZWOPER training to the 24-hour level and maintains all training records.

With respect to vessels of opportunity, SEAPRO keeps a file of potential choices. Because of their existing training, response team members who own vessels are looked upon as the first source of assets. Charter contracts with vessels sourced through this method are not executed until the time of dispatch. Nevertheless, SEAPRO operations manager, Pete Pritchard, felt he could identify 3-5 boats in every community that were suitable candidates. The SEAPRO vessel of opportunity list is populated by those who have sought out a relationship with the cooperative rather than the opposite. The efficacy of this system has been tested during Geographic Response Strategy (GRS) ground truth exercises and by actual responses such as the 2004 grounding of the Alaska Marine Highway ferry *LeConte*.

Mr. Pritchard characterized SEAPRO response team members as "loggers and fishermen who can be put in a boat to do anything, fix anything and get the job done in any kind of weather." With such a vast geographic response area and only three towns that are linked by road, SEAPRO seems to have cultivated a network of reliable neighbors to form the "backbone of spill response in the Southeast."

4.2.7 Organizations Contacted but Not Interviewed

The following oil spill response organizations were contacted but unavailable for interview within the time allotted to this study:

- Alaska Chadux Corporation
- Australian Marine Oil Spill Center (AMOSC)
- (CEDRE)
- Clean Caribbean Cooperative
- Clean Islands Council / MSRC
- Clean Seas
- Eastern Canada Response Corporation
- Mackenzie Delta Spill Response Corporation

4.3 Response Organization Interviews – Tabular Results

Table 4-1: Vessel-of-opportunity programs

Organization	Primary Area of Interest	Vessel of Opportunity Program or Policy	Use of Area Coordinators	HAZWOP Training	Paid for Training	Paid Retainer	Vessel Response Commitment
Alaska Chadux	Rural Western Alaska	Organization unavailable for interview					
Alaska Clean Seas	Prudhoe Bay, Alaska	No formal program exists.	N/A	N/A	N/A	N/A	N/A
Australian Marine Oil Spill Centre (AMOSC)	Coastal Australia	Organization unavailable for interview					
Burrard Clean Operations (BCO)	Coastal British Columbia	1) 107 fishing vessels enrolled in a formal program. 2) Commercial vessels identified by pre-placed contract.	Yes, 5 area coordinators appointed from local communities.	By BCO	Yes	No	As available
Centre of Documentation, Research & Experimentation on Accidental Water Pollution (CEDRE)	France	Organization unavailable for interview					
CISPRI	Cook Inlet, Alaska	+/- 100 assets composed of both commercial and fishing vessels. Fishing vessels are the predominant type.	Yes, 1 subcontracted individual.	By CISPRI	Yes	No	As available
Clean Caribbean Cooperative	Caribbean, Latin America & South America	Organization unavailable for interview					
Clean Coastal Waters / MSRC	Long Beach, California	Provided by Mariners' Oil Spill Team					
Clean Island Council / MSRC	Hawaiian Islands	Organization unavailable for interview					

Organization	Primary Area of Interest	Vessel of Opportunity Program or Policy	Use of Area Coordinators	HAZWOP Training	Paid for Training	Paid Retainer	Vessel Response Commitment
Clean Rivers Cooperative	Lower Columbia River	Technically no program exists within Clean Rivers. Their response contractor, CCS, has made limited but successful use of local fishermen as part-time employees.	No	Through CCS	Yes	Clean Rivers' primary response contractor is paid a retainer to staff their equipment.	CCS is obligated to respond when called-out.
Clean Seas	South Central California Coast	Organization unavailable for interview					
Cowlitz Clean Sweep (CCS)	Lower Columbia River	4-gillnet fisherman compensated as "on call" part-time employees. Personal boats not used.	No	By CCS	At reduced rate.	When on-call and therefore obligated to respond.	N/A
Eastern Canada Response Corp.	Canadian Great Lakes, Atlantic Region & Quebec	Organization unavailable for interview					
Global Diving & Salvage	Puget Sound, Washington	No	No	N/A	N/A	N/A	N/A
Islands' Oil Spill Association (IOSA)	San Juan Islands, Washington	26 personally owned commercial vessels from within their responder membership.	No	By IOSA	No	No	As available
Mackenzie Delta Spill Response Corp.	Canadian Arctic from Great Slave Lake to the Beaufort Sea	Organization unavailable for interview					
Mariner Oil Spill Team	Los Angeles, California	40 - commercial fishing vessels	Yes, one administrator associated w/ Los Angeles Commercial Fishermen's Association	8-hour annually by MSRC	No	No	As available
MSRC - Northwest Region	Washington and Oregon	1) sub contracted commercial vessels, and 2) maintains a list of fishing vessels potentially available for spill response	Two subcontracted individuals track fishing vessels on an "as needed" basis	Typically not given by MSRC.	Training has been infrequent	No	As available

Organization	Primary Area of Interest	Vessel of Opportunity Program or Policy	Use of Area Coordinators	HAZWOP Training	Paid for Training	Paid Retainer	Vessel Response Commitment
National Response Corporation (NRC) Northwest Region	Washington & Oregon	Not specifically for vessels but has formal program for "standby" personnel with Makah Tribe and Job Corp Training Center in Astoria	No	By NRC	Yes	No	N/A
Oil Spill Response Limited (OSRL)	Based in UK and Singapore, responds worldwide	Over-the-road and flyaway packages designed to be placed aboard vessels of opportunity.	Unknown	Will provide some level of health & safety training as required in each location.	N/A	N/A	N/A
SEAPRO	Southeast Alaska	Informal list of 3 to 5 vessels of opportunity in each of 27 communities	No	Yes	No	No	As available
SERVS	Prince William Sound Alaska	395 fishing and specialty vessels enrolled in a highly structured program.	7 area coordinators plus their alternates	Annually by SERVS	Yes	Tier 1 boats receive a winter "readiness" stipend	Tier 1 boats must respond in 6-hours. Tier 2 boats 12-24 hours when available.
Thirteenth Coast Guard DRAT	Puget Sound	Interagency agreements for government-owned vessels.	No	N/A	N/A	N/A	Unknown

SECTION 5

A Scenario-based Approach to Identifying Vessel Shortfalls in Spill Response

A scenario was prepared for an oil spill in the region of the San Juan Islands, and a response workforce was developed to respond to it. This study technique identified a potential shortfall between the number of vessels desired in the idealized response and the number known to be dedicated in the region. While some of the shortfall could be made up by fishing vessels of opportunity, it is not apparent that existing spill management programs could deliver these needed vessels on a timely basis.

5.1 The Scenario

A 10,000-barrel ANS crude spill in Rosario Straits

For the purposes of this study, the scenario is initiated by a collision between a TAPS (Trans Alaska Pipeline System) trade tanker and her escort tug. This incident takes place in Rosario Straits near Burrows Island. The tanker leaks approximately 10,000 barrels of Alaska North Slope crude oil over a four-hour period until hydrostatic equilibrium is achieved. A flood tide carries the leading edge of the slick northward in Rosario Straits. Wind conditions push it in a westerly direction toward the San Juan Islands.

Incident Date:	Wednesday 22 June 2005
Incident Location:	0.9 nm west of Burrows Island
Position:	48° - 29' N, 122° - 44' W
Wind Direction:	Southeast
Wind Speed:	10 knots
Product Spilled:	ANS Crude Oil
Volume Spilled:	~ 10,000 barrels
Initial Time of Release:	1000 (PDT)
Duration of Release:	4-hours

This scenario was selected for its plausibility. It is larger than the largest spill to have occurred in Washington waters since the *Nestucca* spill in 1986. It is substantially smaller than either the current planning standard or some predictions of the median discharge from a tankship involved in a collision, allision or grounding. It is considered to be realistic because single-sided tank vessels in the TAPS trade still call at Puget Sound ports, and are expected to continue calling until 2008 and beyond (The Glosten Associates,

2005), and because a collision between a vessel and her escort has occurred (M/V *Allegiance* and Tug *Sea King*, January 2002).

As a visual aid for this scenario, a trajectory model was prepared by the NOAA Scientific Support Coordinator. This trajectory plotted the position of the slick at *release + 24 hours* (Figure 5-1) and *release + 48 hours* (Figure 5-2).

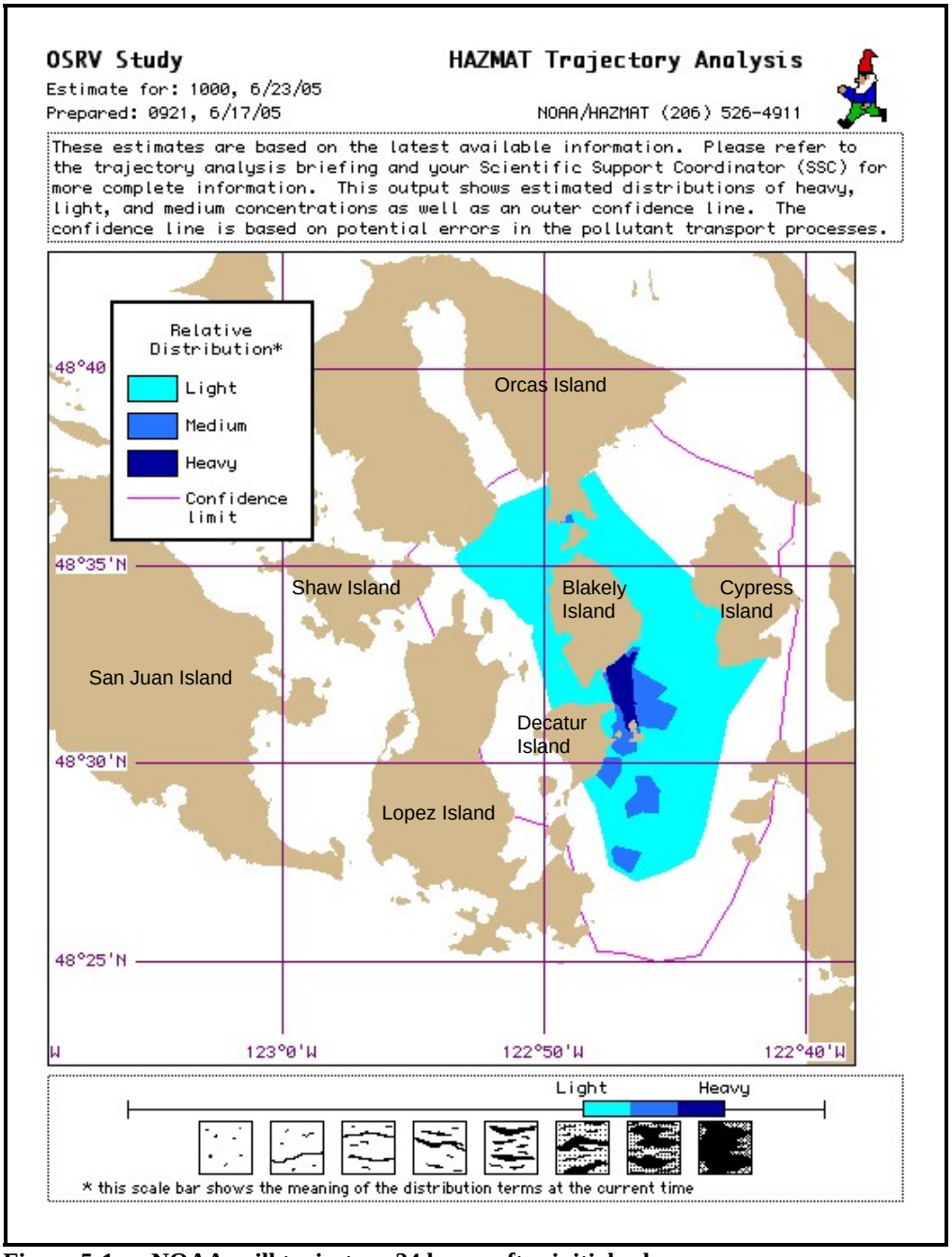

Figure 5-1: NOAA spill trajectory 24 hours after initial release

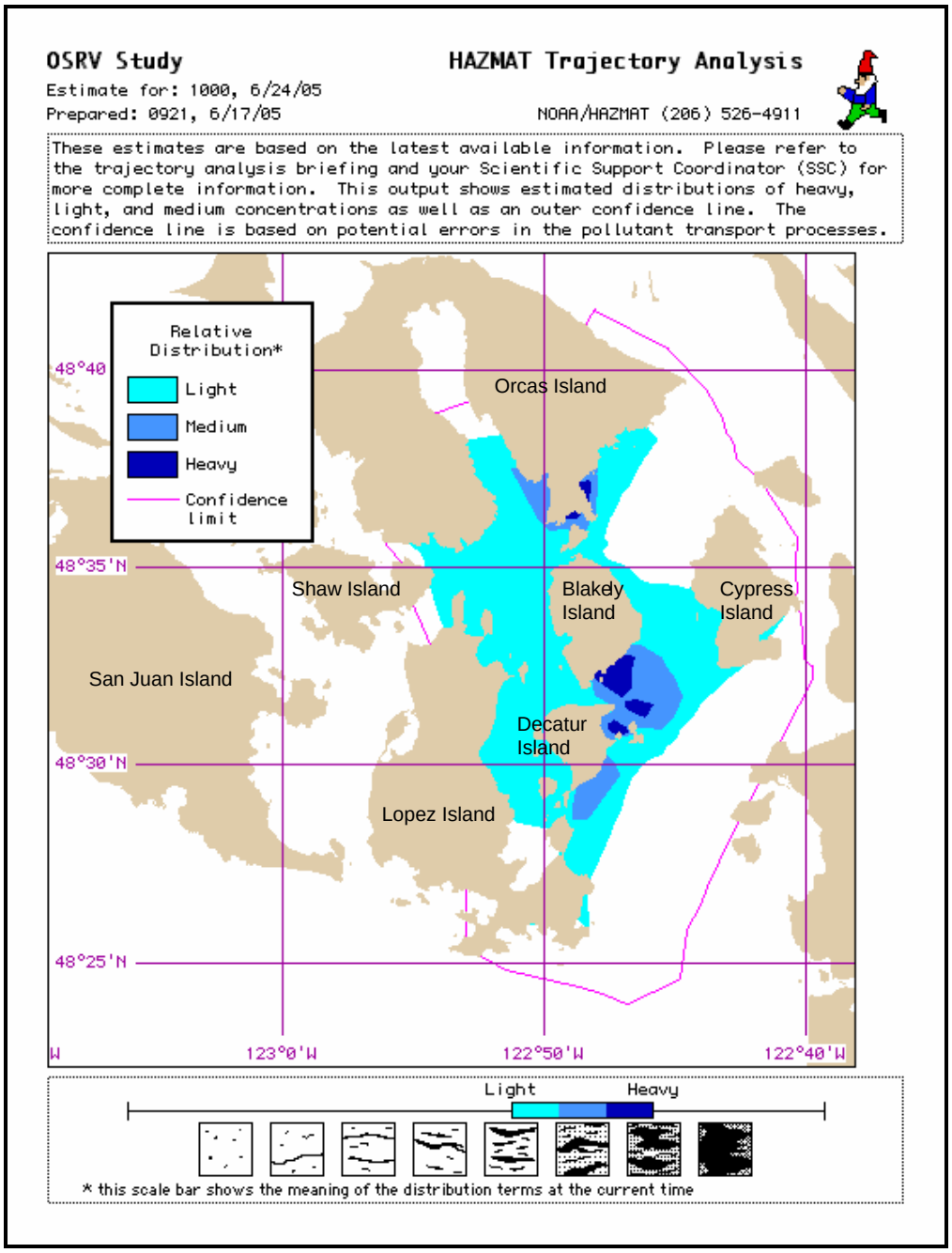

Figure 5-2: Spill trajectory 48 hours after initial release

This spill would likely trigger the defensive response strategies from the Geographic Response Plans (GRPs) for San Juan Islands, North Puget Sound and North Central Puget Sound (Washington State DOE, 2003).

5.2 The "Dream Team" of Response Resources

A response team "wish list"

The authors reviewed the spill scenario, the NOAA trajectories and the GRPs, and prepared a "wish list" of on-water resources to respond to the

spill. Once grouped into task force assignments, all response activities were afforded equal priority.

5.2.1 GRP defense strategies

The study team reviewed the response strategies listed in the GRPs. The scope of work they defined included the installation of more than 44,000 feet of containment boom at 31 locations. These locations are displayed in Figure 5-3 and Figure 5-4, overlaid on the 24- and 48-hour NOAA spill trajectory. There are 5 locations that lie at least two miles outside of the "Confidence Limit": NPS 23, 24 & 70 and NC 1 & 2. These have been included in the resource allocation models as a matter of political expedience.

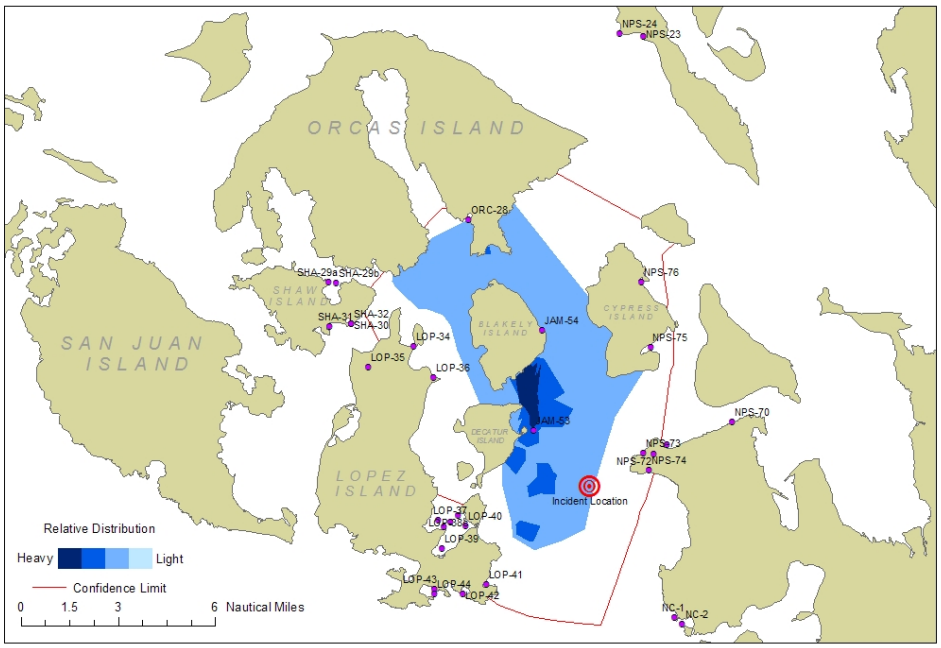

Figure 5-3: GRPs shown with spill trajectory 24 hours after release

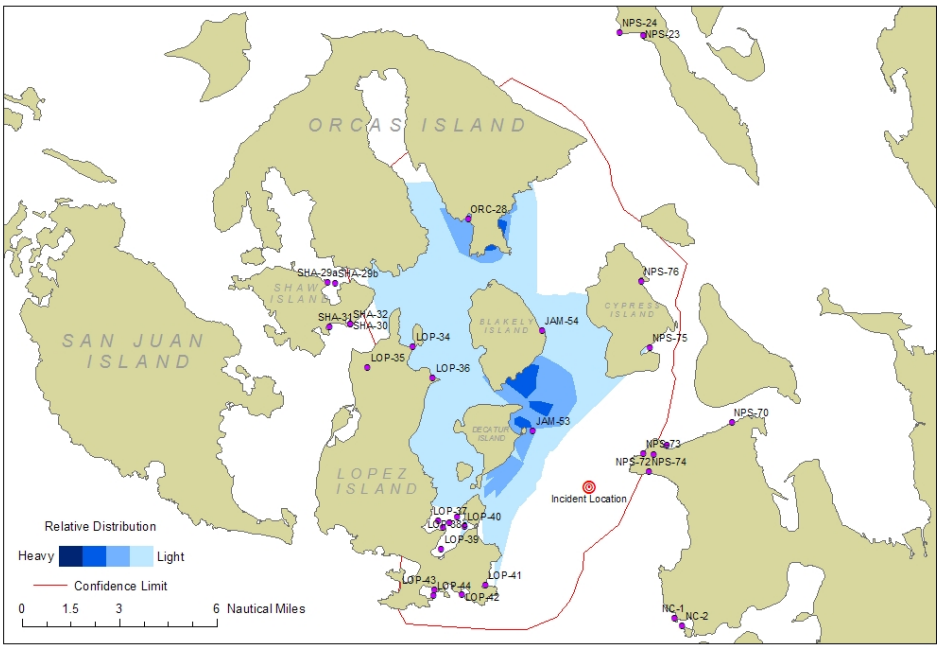

Figure 5-4: GRPs shown with spill trajectory 48 hours after release

After determining that there were sufficient quantities of containment boom and grouping individual strategies geographically to improve response efficiency, vessel resources were arranged in task forces at each of 15 locations. For the purposes of this scenario, response vessel needs were segmented under a 3-boat classification scheme as either *motherships*, *fast response vessels* or *skiffs*.

Motherships are support vessels greater than 40 feet in length with cranes and some crew amenities, such as galleys. *Fast response vessels* (FRVs) are smaller than motherships, without cranes or facilities, but able to load and deploy up to 1500' of boom. For the purpose of this exercise, skiffs were defined as small open boats, 20 feet or more in length with at least 55 horsepower and capable of towing several hundred feet of boom in moderately protected waters.

38 vessels for GRP strategies

The GRP strategies, along with the assigned resources are presented in Appendix B. The resulting "dream team" of response resources for this spill scenario includes 6 motherships, 20 FRVs and 12 skiffs.

This required-vessel list was then compared with the available resources from the Northwest Area Contingency Plan Equipment List. Needs were filled from dedicated resources on the basis of the following assumptions:

- No federal response assets (such as Navy-owned equipment) could be deployed.

- No equipment belonging to petroleum handling facilities could be deployed (to maintain the regulatory compliance levels at those locations).
- MSRC assets from Seattle north could be fully deployed.
- No MSRC assets based south of Seattle could be deployed (to maintain protection levels intact for south end members). Note: The impact of this restriction is discussed in further detail below.
- All other primary response contractors (NRC and Global Diving and Salvage) could be fully deployed.
- The timeframe to fully execute these GRPs lies between the 24-hour and 48-hour mark. During an actual response, GRP execution would be adjusted based on real-time information updated each planning cycle.
- OSROs and contractors have been assumed to be logistically self-supporting and therefore not consumers of vessel resources.

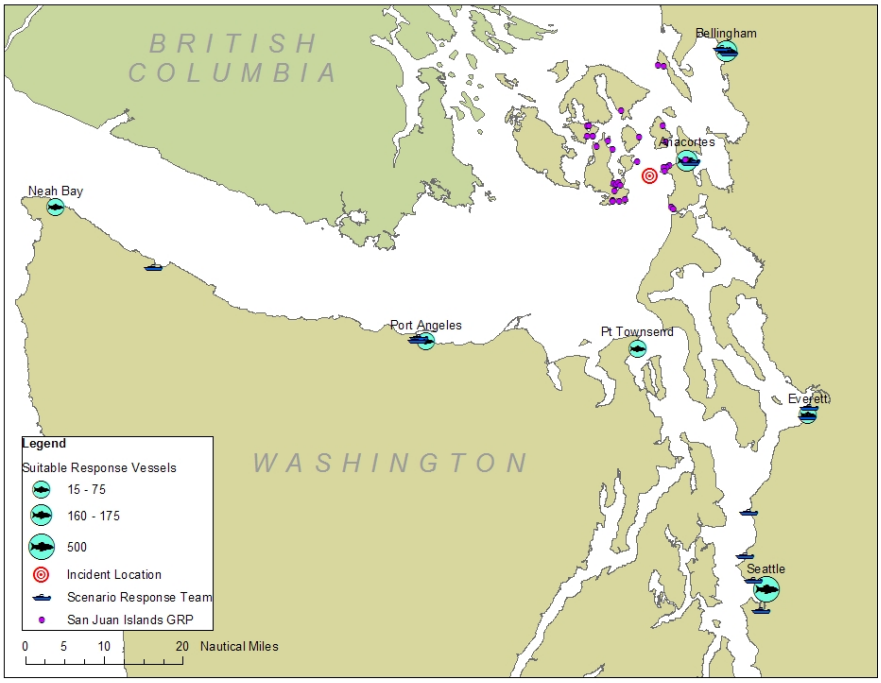

Figure 5-5: Geographic distribution of dedicated and non-dedicated vessel resources

A shortfall of 15 vessels

Subject to the constraints listed above, useful, dedicated resources identified in the Northwest Equipment List totaled 3 motherships, 15 FRVs and 5 skiffs, and are listed below in Table 5-1. Many response industry personnel in Puget Sound believe that, for a spill of this magnitude, all resources in the Sound would be mobilized. If we were to lift the "Seattle-northward"

constraint on dedicated resources, the Northwest Equipment List would yield 3 motherships, 18 FRVs and 6 skiffs, an increase of four vessels.

Table 5-1: Dedicated response resources mobilized for scenario

Sort: Vessels Selected for Scenario Response

OSRO	Resource	Kind - Type	Identification	Specifications	Home Base	Staging	Classifcation
CSCI	V-WB-42	WB-3	OSPREY	42' Work Boat	Anacortes	In Water	>40' support
CSCI	V-WB-42	WB-3	EAGLE	42' Work Boat	Bellingham	In Water	> 40'support
CSCI	V-WB-38	WB-3	MALLARD	38' Work Boat	Port Angeles	In Water	FRV
CSCI	V-WB-38	WB-3	LOON	38' Work Boat	Port Angeles	In Water	FRV
CSCI	V-WB-36	WB-3	TEAL	36' Work Boat	Anacortes	In Water	FRV
CSCI	V-WB-36	WB-3	AVOCET	36' Work Boat	Seattle	In Water	FRV
CSCI	V-WB-34	WB-3	PUFFIN	33' Work Boat	Port Angeles	In Water	FRV
CSCI	V-WB-18	SB-3	EGRET	Seine Skiff	Anacortes	In Water	≥ 55HP skiff
CSCI	V-WB-18	SB-3	JAEGER	Seine Skiff	Everett	Warehouse	≥ 55HP skiff
CSCI	V-WB-18	SB-3	WILLET	Seine Skiff	Port Angeles	Ondeck KITTIWAKE	≥ 55HP skiff
GDS	V-WB-62		Landing craft w/crane	350 HP, 62 ft	Seattle	dock	> 40'support
GDS	V-WB-34		SRV 1	34 ft, 30 knots	Seattle	dock	FRV
MSRC	V WB 26	V WB	Utility Boat / Small Support	Utility Boat<29'	Everett	Trailer	≥ 55HP skiff
MSRC	V CB 10	V CB	Large RHIB 9m	Response 5, Crew Shuttle	Everett	Trailer	≥ 55HP skiff
NRCES	V-WB-32	WB	Response Vessel 32'	Kvichak FRV #9, #6055	Seattle, P-90	Moorage	FRV
NRCES	V-WB-32	WB	Response Vessel 32'	Kvichak FRV #8, #6053	Anacortes	Moorage	FRV
NRCES	V-WB-32	WB	Response Vessel 32'	Kvichak FRV #6, #6049	Bellingham, Port	Moorage	FRV
NRCES	V-WB-32	WB	Response Vessel 32'	Kvichak FRV #5, #6047	Everett	Moorage	FRV
NRCES	V-WB-32	WB	Response Vessel 32'	Kvichak FRV #4, #6045	Port Angeles	Moorage	FRV
NRCES	V-WB-32	WB	Response Vessel 32'	Kvichak FRV #2, #6039	Sekiu	Moorage	FRV
NRCES	V-WB-32	WB	ServiceVessel 32'	Kvichak 32', #6771	Seattle, E.ST	Moorage	FRV
NRCES	V-WB-27	WB	Workboat 27'	Husky Raider Aluminum	Seattle, Pt Wells	Yard	FRV
NRCES	V-WB	WB	Workboat	Otter, landing-craft, #6403	Seattle, Pt Wells	Yard	FRV

CSCI - Clean Sound Coop (Now Marine Spill Response Corp)
GDS - Global Diving & Salvage
MSRC - Marine Spill Response Corp
NRCES - National Response Corp

Summary Vessel Count

No. of FRVs	**15**
No. of "Mother ships"	**3**
No. of Skiffs	**5**

Table 5-2: GRP vessel resource analysis

DREAM TEAM SCENARIO RESPONSE			
Vessel Type	**Number desired**	**Number Available**	**Shortfall**
Mothership	6	3	**3**
FRV	20	15	**5**
Skiff	12	5	**7**

Lifting the geographical response constraint of "Seattle-northward" decreases the potential shortfalls to 3 motherships, 2 FRVs and 6 skiffs.

5.2.2 SCAT transportation

2 boats for SCATs?

In addition to the GRP work defined above, a spill of this magnitude could create the need for two or more *shoreline cleanup assessment teams* (SCATs). Assuming that helicopters are either in short supply or inappropriate vehicles, alternative transportation must be provided. One way to support the SCATs is to assign them a larger host vessel that carries a decent-size outboard-driven skiff or inflatable boat. Under our 3-boat classification scheme, these could be either motherships or FRVs.

5.2.3 Wildlife recovery

2 boats for wildlife recovery?

A spill of this magnitude could create the need for two or more wildlife recovery teams, for whom water-borne transportation must be provided. As with the SCAT transportation, a wildlife team may be assigned to a larger host vessel that carries a decent-size outboard-driven skiff or inflatable or boat. Under our 3-boat classification scheme, these should be either motherships or FRVs with a larger, heated cabin for transporting live animals in distress, and adequate space for decontamination stations.

5.2.4 Beach precleaning

3 boats for pre-cleaning?

Pre-cleaning of beaches in advance of the spill trajectory is another potential consumer of vessels. Pre-cleaning involves moving flotsam that could be contaminated to a place above the high water mark. While much of this activity can be supported from the land side, an argument can be made for assigning three additional boats to this duty in this scenario. Again, these could be either motherships or FRVs.

5.2.5 Enhanced skimming

Up to 18 boats for enhanced skimming?

The last consumer of vessels is enhanced skimming operations. Each skimmer is assigned two towboats to tow boom in a vee configuration ahead of it to concentrate the oil. These may be a useful addition to some of the recovery vessels expected to get underway as part of the dream team. Table 5-3 below suggests that an additional 18 boats, motherships or FRVs, could be useful as towboats for enhanced skimming operations.

Table 5-3: Dedicated skimmers and candidates for enhanced skimming

Sort: Recovery Vessels Selected for Scenario Response

OSRO	Resource	Kind - Type	Identification	Specifications	Home Base	Staging	Enhanced Skimming?
MSRC	R OSRV 1	R OSRV	OSRV, Park Responder	Storage, Crew	Port Angeles	Ship	
CSCI	R-VS	RV	PINTAIL	W/ Lori Brush	Port Angeles	In Water	y
NRCES	R-VS	RV	Belt Skimmer Vessel	Marco/1C, #1, 6059	Seattle, Pt Wells	Trailer #6066	
CSCI	R-VS	RV	ALEUTIAN TERN	Marco Skimmer	Anacortes	In Water	y
CSCI	R-VS	RV	GREBE	Marco Skimmer	Bellingham	In Water	
CSCI	R-VS	RV	SANDPIPER	Marco Skimmer	Everett	Warehouse	y
CSCI	R-VS	RV	AUKLET	Marco Skimmer	Everett	Trailer 55	
CSCI	R-VS	RV	WIDGEON	Marco Skimmer	Seattle	In Water	
NRCES	R-VS	RV	Belt Skimmer Vessel	Marco /1C, #2, 6060	Seattle, Pt Wells	Trailer #6067	
CSCI	R-VS	RV	HERON	40' Skimmer	Bellingham	In Water	y
CSCI	R-VS	RV-1	SHEARWATER	JBF Skimmer	Port Angeles	In Water	y
CSCI	R-VS	RV-2	CORMORANT	Marco Skimmer	Seattle	In Water	y
CSCI	R-VS	RV-2	ROYAL TERN	JBF Skimmer	Anacortes	In Water	y
CSCI	R-VS	RV-2	WESTERN GULL	JBF Skimmer	Bellingham	In Water	y
CSCI	R-VS	RV-2	ARCTIC TERN	JBF Skimmer	Port Angeles	In Water	y

CSCI - Clean Sound Coop (Now Marine Spill Response Corp)
GDS - Global Diving & Salvage
MSRC - Marine Spill Response Corp
NRCES - National Response Corp

Summary Vessel Count

No. of Skimmers	**15**
Candidates for Enhanced Skimming	**9**

Lifting the "Seattle-northward" geographical constraint would mobilize 3 additional skimmers from the South Sound that are candidates for enhanced skimming operations. This could increase boat demand by 6 to 24.

5.2.6 Total potential dream team fishing vessel utilization

In the preceding sections, a world of unconstrained resources and equal priorities of protection are presented to a spill management team. Under those guidelines, the effectiveness of a response effort could be improved by employing between 15 and 40 vessels in excess of the dedicated resources known to exist. If the "Seattle-northward" geographical constraint were lifted, the vessel demand is between 11 and 42 boats.

5.3 Using Vessels of Opportunity to "Fill the Gap"

A vessel pool 5 times as large as expected demand?

Section 3 of this report describes which fishing vessels might be able to fill the roles of motherships, FRVs and skiffs. For motherships, only distant water fleet assets are deemed suitable: Alaska seiners, Alaska crabbers and Alaska tender/buyers. Dive fishery boats and gillnetters may prove practical as replacements for FRVs, while seine skiffs could replace the heavy skiffs.

The expected turn-out ratio (percentage of vessels able to respond out of the number of vessels contracted) is quantified in a draft report to the Prince William Sound Regional Citizens Advisory Committee, prepared by Nuka Research and Planning Group (Ecola, et al., 2004).

> "In October 2003, Tesoro Alaska held a tabletop drill to test, among other objectives, the SERVS fishing vessel response program in Kodiak in the event of a major Prince William Sound oil spill. The day prior to the exercise, the Kodiak fishing vessel administrator performed a tabletop callout of contracted Tier II vessels. Of the 65 contracted vessels, 45 had received training the previous spring. Of those 45, 21 were available to respond. On the day of the exercise, the fishing vessel administrator made 61 calls but was only able to contact 11 vessel owners."

This excerpt implies a turn-out ratio of less than 17%. That means the vessel of opportunity pool should be more than five times the desired number of vessels. If we predict the need for 40 vessels, the pool of vessels of opportunity should number at least 245.

5.4 Assessment of Existing Programs and Their Ability to "Fill the Gap"

This study examined only a hypothetical spill of 10,000 barrels. Planning standards in the region focus on spills many times that size. This spill scenario, and the response exercise it generated, served to show that, in terms of the quantity of oil spilled, the threshold for being able to use vessels of opportunity is relatively small.

Existing programs not geared to turn out additional vessels

The state's OSROs rely on pre-placed contracts with commercial vessel resources – tugs, launches and barges in particular. It is believed that these programs will provide all the on-water resources necessary for them to meet their basic obligations under their PRC classification. There was no strong evidence presented during the interviews that these programs, most of which are based on "as-available" contract terms, can produce enough vessels to meet the shortfalls defined herein (GRP work, SCAT transport …) *in addition to their obligations as certified contractors*.

In the opinion of the study group, it is unreasonable to assume that any existing vessel of opportunity program among the state's response organizations is capable of producing even 15 suitable craft within 24 hours to further augment their response effectiveness. IOSA's community-based program and MSRC's commercial program have the best chance of producing the desired results. These two groups have reported 26 and 150 vessels enrolled in their respective programs. Given that MSRC's program can currently be described as "passive" in its recruiting effort and "inactive" in vetting vessels or training crews, for them to achieve a turn-out ratio approaching 17% is not a reasonable expectation. Therefore, their resource pools are considered to be marginal.

SECTION 6

A Formalized, Statewide Program for Recruiting, Training and Managing Vessels of Opportunity

An outline of the key features of a statewide fishing vessel program and a preliminary estimate of one-time and recurring costs is presented.

6.1 The Minimum Requirements for a Formal Statewide Fishing Vessel Program

The following discussion suggests a program structure championed by the Washington State Department of Ecology, and coordinated through the Region 10 Regional Response Team/Northwest Area Committee. While this study focused on Washington State, the expansion of any program to include all of Region 10 would be a natural progression.

6.1.1 Outreach to identify suitable vessels

Identify a pool of 250 vessels

As a first step in developing the program, enough suitable vessels must be identified. Initially, the outreach program can target the affinity groups or the home ports identified in Section 3 to gauge the willingness of vessel owners to participate. The results of this outreach will play a significant role in the organization of the formal program.

Based on a turnout ratio of 17%, and a plausible shortfall of response assets of 40 vessels, the program should target a minimum enrolled vessel count of 250, properly distributed among the most useful types and all homeports.

6.1.2 Establishment of minimum vessel standards

Vetting the vessels and equipment

There is a wide disparity between the condition of the best boats and worst boats viewed in brief homeport visits. A statewide program should establish minimum standards that all enrolled vessels must meet. The list of expected safety, communication and navigation equipment in Section 3 is reproduced below and should represent the minimum acceptable equipage:

- Immersion suits
- Life buoy with line

- Life raft
- Distress signals
- Fire extinguishers
- Marine sanitation device (MSD) with tank
- Compass
- Anchors
- Coast Pilot
- Light list
- Tide/current tables
- General alarm
- High water/bilge system
- Flame arrestors (gas inboards)
- Fire suits, SCBAs (when there are more than16 persons onboard)
- VFH & HF radios, EPIRB
- GPS
- Fathometer
- Radar
- Radar reflectors

No vessel should be disqualified on the basis of hull material. Metal vessels are the most easily decontaminated. Nonetheless, fiberglass and wood hulls may be acceptable provided they are in good material condition, as are their coating systems (paint).

For larger vessels intended as task force "motherships," minimum crew amenities will be important, as will clear working decks and cranes.

Minimum insurance or new insurance facility

Another consideration in the vetting process is insurance held by the vessel. Ideally, certificates of insurance should be held on file as part of the information for each enrollee. The State of Washington insurance requirements for contractors represents a reasonable minimum level of insurance:

The CONTRACTOR shall provide insurance coverage which shall be maintained in full force and effect during the term of this Contract, as follows:

1. ***Commercial General Liability Insurance Policy - Provide a Commercial General Liability Insurance Policy, including contractual liability, in adequate quantity to protect against legal liability arising out of contract activity but no less than $1,000,000 per occurrence. Additionally, the CONTRACTOR is responsible for ensuring that any subcontractors provide adequate insurance coverage for the activities arising out of subcontracts.***
2. ***<u>Automobile Liability</u>. In the event that services delivered pursuant to this contract involve the use of vehicles, either owned or unowned by the CONTRACTOR, automobile liability insurance shall be required. The minimum limit for automobile liability is:***

   $1,000,000 per occurrence, using a Combined Single Limit for bodily injury and property damage

3. The insurance required shall be issued by an insurance company/ies authorized to do business within the State of Washington, and shall name the state of Washington, its agents and employees as additional insureds under the insurance policy/ies. All policies shall be primary to any other valid and collectable insurance. CONTRACTOR shall instruct the insurers to give AGENCY 30 days advance notice of any insurance cancellation.

CONTRACTOR shall submit to AGENCY within 15 days of the contract effective date, a certificate of insurance which outlines the coverage and limits defined in the Insurance section. CONTRACTOR shall submit renewal certificates as appropriate during the term of the contract.

Even this minimal level of insurance may not be achievable for some potential enrollees. To improve the pool of potential resources, an insurance facility should be created that can be bound by vessels of opportunity on short notice. Reportedly, SERVS has developed this facility through their parent organization's self-insurance.

Input from the OSROs into the vetting standards is necessary to ensure that their needs and concerns are being met.

6.1.3 Establishment of minimum crew training standards

Vetting the crews

It was disappointing to discover that other than the voluntary safety program sponsored by the North Pacific Fishing Vessel Owners Association (NPFVOA), no lowest common denominator exists for crew qualifications on fishing vessels under 200 gross tons. In order for the state to endorse a statewide program, one that may entrust the safety of responders to fishing vessel operators, there must be a minimum code of conduct for seamanship. Source documents identified in Section 3.4, particularly the AWO Responsible Carriers Program and NPFVOA Vessel Safety Manual, may be used as starting points for the development of the code of conduct. At a minimum, a self-certification program must be put in place for enrolled vessels to demonstrate compliance with safe operating procedures and policies.

Minimum HAZWOPER qualifications must be agreed upon by the State and Federal occupational safety authorities. This report suggests that the work done by fishing vessels of opportunity will be inherently low risk from the standpoint of exposure to petroleum or chemical hazards, and that they will be properly supervised by qualified professional responders when deployed. Therefore, the 8-hour training standard described under WISHA Regional Directive 32.99 provides an appropriate training standard for the work expected of the fishing vessels of opportunity.

During their development, crew training standards for enrollees would benefit from the involvement of the response community in Washington.

6.1.4 Business arrangements

Contracting – how and with whom?

Vessels of opportunity should work under contract to a primary response contractor or the responsible party, depending on how the spill is managed by the responsible party. This provides a clear chain of financial responsibility and operational control.

Fishing vessel owners may not be accustomed to entering charter agreements other than the occasional bareboat charter. In their normal work, they are not exposed to such contracts. It is inadvisable for a statewide program to operate on the basis of verbal commitments. A standard charter agreement, common across the state (or region), must be developed to protect all parties from misunderstandings as well as the liabilities of others. The Baltic and International Maritime Council (BIMCO) publishes standard forms for charter parties, such as the Uniform Time Charter Party for Offshore Service Vessels ("Supplytime 89"). While BIMCO's documents are widely recognized and understood among international shipping interests, they may be far too intense for use in this context – scaring away more potential service providers than they attract.

In developing the charter agreement, all stakeholders must be involved: the OSROs, the affinity groups and owners, and the state and representatives of the insurance community, especially the liability underwriters and P&I clubs who eventually pay the bills. It is hoped that a simple, fair and concise document can be developed, similar to the early Lloyds Standard Form of Salvage Agreement, which was introduced in 1908 and quickly earned worldwide recognition as a fair contract, easily executed.

As part of the outreach program with vessel owners, the charter agreement should be widely disseminated and discussed, so that everyone is comfortable with it.

6.1.5 Ongoing communications, management of the database of vessels of opportunity and outreach programs

Use affinity groups to improve communication

In order to be successful, a statewide vessel-of-opportunity program must be perpetuated. That means ongoing, active outreach and information exchange to ensure that resource lists are accurate, and that all OSROs have access to them. It will not be good enough to develop the list of enrolled vessels once and walk away. The fishing community is far too fluid for any list of contacts to remain valid for long. By working through the affinity groups, though, the lines of communication may be shortened.

6.1.6 The resources required

The fishing vessel coordinator is the focal point for program development

The statewide program will need a central focal point – an individual or organization that is responsible for maintaining the program. From the evidence provided by OSROs with successful fishing vessel programs, a responsible program coordinator must be appointed. Whether this is a full-time job is yet to be determined. It is the view of the study group that the state should lead the way in the establishment of this program. It would be a waste of resources for each OSRO in the state to develop its own program. In the competitive marketplace, there is no incentive for OSROs to share the benefit of a vessel of opportunity program with others, without sharing the expense – and there appears to be no mechanism for sharing the expense.

In the cost section that follows, for the sake of simplicity, it is assumed that a project position is established within the Department of Ecology to develop and manage the program.

6.2 The Cost of a Formal Program

All labor costs are based on the loaded hourly rate for a mid-level environmental specialist at a rate of ES 5. Where outside consultants or marine surveyors are required, their working hours are calculated at a billing rate of $100 and $65 per hour respectively.

Cost estimates are presented as ranges with confidence levels

It is a challenge to estimate the cost of a program whose true scope is not completely known. In Table 6-1, optimistic and pessimistic cost estimates for individual line items are presented. These numbers demonstrate the enormous variability in costs for a program in its embryonic stage. In some cases, the difference between optimistic and pessimistic estimates are an order of magnitude. Elsewhere, they are a fractional multiplier.

In an attempt to narrow the range of the estimate, the data were subjected to a statistical treatment wherein any number within the range for a particular line item was given equal probability of occurrence. Variance and standard deviations were computed to produce the estimates at the 64% and 95% confidence levels.

Table 6-1: Cost Estimating Model for Wa ECY Fishing Vessel Program

Cost Estimating Model for Wa ECY Fishing Vessel Program

One Time Expenses	(F)ixed or (V)ariable Cost	Primary Cost Driver for Variable Cost Items	Optimistic Estimate Labor	Optimistic Estimate 3rd Party Costs	Optimistic Estimate Total Cost	Pessimistic Estimate Labor	Pessimistic Estimate 3rd Party Costs	Pessimistic Estimate Total Cost
Benchmarking Against SERVS, Burrard Clean	F		$ 3,073.60	$ 1,600.00	$ 4,673.60	$ 6,147.20	$ 2,600.00	$ 8,747.20
Outreach Program for Owners/Affinity Groups	V	Number of indivdual contacts	$ 6,147.20	$ 500.00	$ 6,647.20	$ 30,736.00	$ 2,500.00	$ 33,236.00
Create Vessel Vetting Program	F		$ 8,633.60	$ 100.00	$ 8,733.60	$ 12,950.40	$ 100.00	$ 13,050.40
Create Vessel Response Charter Agreement	F		$ 5,536.80	$ 9,000.00	$ 14,536.80	$ 8,305.20	$ 13,500.00	$ 21,805.20
Vet vessels for inclusion	V	Number of vessels	$ 32,692.10	$ 5,062.50	$ 37,754.60	$ 65,384.20	$ 10,125.00	$ 75,509.20
Investigate Alternative Insurance Coverage	F		$ 4,614.72	$ 100.00	$ 4,714.72	$ 5,768.40	$ 100.00	$ 5,868.40
Set up Vessel Database & Distribution System	F + V	Number of vessels	$ 12,034.10	$ 250.00	$ 12,284.10	$ 24,068.20	$ 350.00	$ 24,418.20
Create Responder Training Program (8/24 hrs)	F		$ 1,536.80	$ 100.00	$ 1,636.80	$ 7,073.60	$ 150.00	$ 7,223.60
Conduct Initial Training	V	Number of crewmembers	$ 9,605.00	$ 3,125.00	$ 12,730.00	$ 99,210.00	$ 6,250.00	$ 105,460.00
Subtotal					$ 103,711.42			$ 295,318.20

Annual Expenses	Fixed of Variable Cost	Primary Cost Driver	Optimistic Estimate Labor	Optimistic Estimate 3rd Party Costs	Optimistic Estimate Optimistic Cost	Pessimistic Estimate Labor	Pessimistic Estimate 3rd Party Costs	Pessimistic Estimate Pessimistic Cost
Program Coordination/administration	F	Number on staff	$ 39,956.80	$ 4,200.00	$ 44,156.80	$ 119,870.40	$ 8,100.00	$ 127,970.40
Responder refresher training	V	Number of vessels	$ 9,605.00	$ 3,125.00	$ 12,730.00	$ 19,210.00	$ 6,250.00	$ 25,460.00
Vessel retainer fee	V	Number of vessels	$ -	$ -	$ -	$ -	$ 150,000.00	$ 150,000.00
Drill participation	V	Number of drills, vessels	$ 1,229.44	$ 1,250.00	$ 2,479.44	$ 9,229.44	$ 2,500.00	$ 11,729.44
Subtotal					$ 59,366.24			$ 315,159.84

Input Labor Rates (loaded)			
Assumed Labor Rate (program office)	$	38.42	per Hour
Assumed Labor Rate (outside consultant)	$	100.00	per Hour
Assumed Labor Rate (surveyor)	$	65.00	per Hour
Assumed Labor Rate (vessel crew)	$	20.00	per Hour

Summary Statistics		Low Cost	High Cost
One Time Costs			
	64% Confidence Limit (1 sigma)	$ 169,200	$ 229,800
	95% Confidence Limit (2 sigma)	$ 139,000	$ 260,100
Annual Recurring Costs			
	64% Confidence Limit (1 sigma)	$ 137,500	$ 237,100
	95% Confidence Limit (2 sigma)	$ 87,600	$ 286,900

6.2.1 One-time costs

6.2.1.1 Benchmarking – an in-depth review of successful fishing vessel programs at SERVS, Burrard Clean and IOSA

From the OSRO interviews summarized in Section 4, the three programs that appear to have yielded positive results are at SERVS in Valdez, Burrard Clean in British Columbia and IOSA in San Juan County. Their size, reach and funding mechanisms vary widely, and more can be learned from observing their operations more closely. The cost estimates are based on either two weeks' or four weeks' effort on the part of a program administrator, plus travel.

6.2.1.2 Outreach program to identify affinity groups and their effectiveness as information conduits

The cost of the outreach program is a function of the number of individuals or groups contacted. The estimate is based on between 16 and 50 individual and in-depth contacts with interested service providers and affinity groups.

6.2.1.3 Vessel vetting program

The standards against which to assess potential enrollees needs to be codified in a qualifications document. The cost of this involves program labor, plus some consultant and marine survey time.

6.2.1.4 Create vessel response charter agreement

The estimate of the cost to produce a standard charter party is heavily weighted toward outside legal counsel and consulting labor.

6.2.1.5 Vet vessels for inclusion

The cost of the vetting program will be in direct proportion to the number of potential enrollees.

6.2.1.6 Investigate alternative insurance coverage

This effort is based on the assistance of outside consultants, managed by the program staff.

6.2.1.7 Set up vessel database & distribution system

This effort is driven by the number of records entered into the system and the complexity of the associated data fields.

6.2.1.8 Create responder training program (8 - 24 hrs)

Creating the responder training program around the WISHA Regional Directive 32.99 should be fairly straightforward and may already exist in the Department of Ecology in a form easily adapted to the program.

The SERVS training program is investigating how an online training program may enhance their ability to reach enrollees in remote areas. This option is worthy of consideration as part of the training program.

6.2.1.9 Conduct initial training

It was assumed that in the first year of the program, at least one member of each enrolled vessel would undergo the WISHA training. The high variability of this line item expense is driven by whether vessel owners will demand an honorarium during training.

6.2.2 Recurring costs

It is believed that the program can be sustained in future years with between 1/2 and 1 ½ full time equivalent employees as caretakers. Beyond that, the remainder of the program expense will depend on the compensation structure of the program and, again, whether it is reasonable to expect enrollees to contribute their own time in drill participation.

6.2.3 Comments on funding

It is beyond the scope of this study to recommend funding sources to undertake a program such as the one described herein.

6.3 The Incremental Benefit of a Formal Statewide Program

Defining the benefit of a statewide program creates an interesting paradox: a major spill must occur for the program to provide a return on investment. There is inherent value in preventing or reducing ecological damage. That value is difficult to quantify.

In attempting to quantify the benefit of improved preparedness, a simplistic model was created based on a paper (Etkin, 2000) that assesses the cleanup cost of our spill scenario. This model is driven by:

- Type of oil spilled
- Amount of oil spilled
- Cleanup methodology
- Gross length of shoreline oiled

It was assumed that the effect of improved execution of shoreline protection strategies would be to lower the gross length of oiled shoreline by a significant level (i.e., from between 20 and 90 kilometers of oiled shoreline to between 8 and 15 kilometers of oiled shoreline). This one change reduced the modeled cleanup cost by more than 12%, from an estimated cost of $7 million to $6.2 million. This difference is enough to fund a fishing vessel of opportunity program for four years. When one considers that natural resource damage assessments have been known to exceed clean-up costs many times over, it is not difficult to extrapolate a financial value for the investment in the fishing vessel program.

Dr. Etkin has done considerable work on modeling response operation costs and benefits since the 2000 paper. Schedule constraints on this project prevented a more thorough treatment using the more sophisticated techniques.

SECTION 7

Conclusions and Recommendations

7.1 Conclusions

This study lends evidence to the following conclusions:

- A spill scenario involving the release of 10,000 barrels of persistent oil in Washington State has demonstrated that a response effort could benefit from the addition of vessels of opportunity. A spill of that magnitude is a statistical possibility.

- The commercial fishing fleet in Washington State includes vessels with characteristics that make them attractive in a spill response effort.

- The number of fishing vessels home ported in the region is adequate to support a vessel of opportunity program in the next several years. However, the fleet is declining as a result of both biological and economic forces. It may not be able to continue to provide a pool of potential resources in future decades.

- Statistically, the seasonal availability of fishing vessels for other than fishing activities dovetails with the apparent seasonal frequency of spill events. That is, many fishing vessels are inactive (and hence available for response work) during the winter months, when spills have been historically most likely to occur.

- There are models of successful fishing vessel programs whose experience can be leveraged in the creation of a statewide program for the recruitment and management of fishing vessels for spill response work.

7.2 Recommendations

This study recommends that the next step be taken toward the creation of a Fishing Vessel / Vessel of Opportunity Program. The components of a successful program will be:

- The appointment of a Program Coordinator to be responsible for the program's creation in a centralized manner that serves all OSROs and spill management teams.

- Establishment of an outreach program for communication with vessel owners and groups representing their interests to facilitate recruitment and communication.

- Establishment of minimum standards for vessels, equipment and personnel as a condition of their enrollment in the program.

- An accurate and up-to-date list of enrolled vessels and their characteristics that is maintained and freely distributed.

- Provision of basic, low-risk hazardous materials training to the vessel operators by the most efficient and effective means, either:
  - in-person training up front,
  - training upon dispatch, or
  - on-line training.

  On-line training is the most intriguing of the three options.

- Provision of an accepted, prearranged contractual agreement between vessels and the representatives of the responsible party.

7.3 A Potential for Unintended Consequences

The intent of the fishing vessel or vessel-of-opportunity program is to add resources for spill response. Any program must be careful not to subvert that intent. The authors are concerned that this program may inadvertently provide the tools and create an incentive for spill management teams to prematurely replace dedicated response vessels with less expensive alternatives. It would not serve anyone to substitute less capable vessels for the highly specialized and professionally managed response vessels that are on station in Washington. The program developers must seek to avoid this and other such unintended consequences.

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APPENDIX A

Northwest Area Plan – Vessels Over 20' Length

Appendix A: Northwest Area Plan – Vessels Over 20' Length

OSRO (6)	Resource (12)	Kind - Type (6)	Identification (24)	Specifications (12)	Liquid Storage bbls (10)	Home Base (12)	State (2)	Staging (13)	Latitude (10)	Longitude (10)
GDS	E		Deck barge	50 ft x 12 ft		Seattle	WA	dock	47-34.14N	122-21.20W
MSRC	R OSRV 1	R OSRV	OSRV, Oregon Responder	Storage, Crew	4,000	Astoria	OR	Ship	46-10.50 N	123-51.20 W
MSRC	R OSRV 1	R OSRV	OSRV, Park Responder	Storage, Crew	4,000	Port Angeles	WA	Ship	48-07.50 N	123-26.45 W
MSRC	R SWB	R SWB	Shallow Water Barge 133	Shallow Water Barge, Self	400	Anacortes	WA	Dock	48-30.70 N	122-36.33 W
MSRC	R SWB	R SWB	Shallow Water Barge 123	Shallow Water Barge, non	400	Seattle	WA	Trailer	47-35.00 N	122-20.80 W
MSRC	R SWB	R SWB	Shallow Water Barge 19	Shallow Water Barge, non	400	Astoria	OR	Trailer	46-10.50 N	123-51.20 W
MSRC	R SWB	R SWB	Shallow Water Barge 23	Shallow Water Barge, non	400	Coos Bay	OR	Trailer	43-22.00 N	124-10.70 W
MSRC	R SWB	R SWB	Shallow Water Barge 25	Shallow Water Barge, non	400	Portland	OR	Trailer	45-36.40 N	122-41.30 W
MSRC	R SWB	R SWB	Shallow Water Barge 51	Shallow Water Barge, non	400	Bellingham	WA	Trailer	48-00.00 N	122-13.00 W
MSRC	R SWB	R SWB	Shallow Water Barge 21	Shallow Water Barge	400	Port Angeles	WA		48-07.50 N	123-26.45 W
CRC	R-SWB	PS-3	SWRB 29-226	30' Kvichak	100	Astoria	OR	CCS- Astoria	46*11.30N	123*51.27W
CRC	R-SWB	PS-3	SWRB 29-230	30' Kvichak	100	Astoria	OR	CCS-Astoria	46*11.30N	123*51.27W
CRC	R-SWB	PS-3	SWRB 29-231	30' Kvichak	100	Longview	WA	Weyco	46*07.92N	122*58.64W
CRC	R-SWB	PS-3	SWRB 29-232	30' Kvichak	100	Longview	WA	Weyco	46*07.92N	122*58.64W
CRC	R-SWB	PS-3	SWRB 29-288	30' Kvichak	100	Portland	OR	CRC	45*00.17N	122*54.55W
CRC	R-SWB	PS-3	SWRB 29-289	30' Kvichak	100	Portland	OR	CRC	45*00.17N	122*54.55W
CNRNW	R-SWB		Barge, Storage SWOB 7	108 ft	1,738	Bremerton	WA	Waterfront	47-33.4N	122-38.0W
CNRNW	R-SWB		Barge, Storage SWOB 8	108 ft	1,738	Bremerton	WA	Waterfront	47-33.4N	122-38.0W

OSRO (6)	Resource (12)	Kind - Type (6)	Identification (24)	Specifications (12)	Liquid Storage bbls (10)	Home Base (12)	State (2)	Staging (13)	Latitude (10)	Longitude (10)
CNRNW	R-SWB		Barge, Storage SWOB 23	108 ft	1,738	Bremerton	WA	Waterfront	47-33.4N	122-38.0W
CNRNW	R-SWB		Barge, Storage SWOB 24	108 ft	1,738	Bremerton	WA	Waterfront	47-33.4N	122-38.0W
CNRNW	R-SWB		Barge, Storage SWOB 25	108 ft	1,738	Bremerton	WA	Waterfront	47-33.4N	122-38.0W
NRC	RV	RV-1	Vessel-#738	NRC Cape Flattery		Neah Bay	WA	In Water-Pt of Neah Bay	48:21:53N	124:36:39W
CSCI	R-VS	RV	PINTAIL	W/ Lori Brush		Port Angeles	WA	In Water	48-07.6 N	122-27.2 W
CSCI	R-VS	RV	BRANT	W/ Lori Brush		Tacoma	WA	In Water	47-16.5 N	122-24.5 W
NRCES	R-VS	RV	Belt Skimmer Vessel	Marco/I-I, #6021	43	Ranier, FMC	OR	Moorage	46-05.1N	122-56.2W
NRCES	R-VS	RV	Belt Skimmer Vessel	Marco/IC, #6011	43	Portland	OR	Trailer #6169	45-33.8N	122-43.79W
NRCES	R-VS	RV	Belt Skimmer Vessel	Marco/1C, #1, 6059	43	Seattle, Pt Wells	WA	Trailer #6066	47-46.5N	122-24W
CSCI	R-VS	RV	ALEUTIAN TERN	Marco Skimmer	67	Anacortes	WA	In Water	48-31.0 N	122-36.3 W
CSCI	R-VS	RV	GREBE	Marco Skimmer	30	Bellingham	WA	In Water	48-45.3 N	122-30.8 W
CSCI	R-VS	RV	SANDPIPER	Marco Skimmer	4	Everett	WA	Warehouse	48-00.0 N	122-13.0 W
CSCI	R-VS	RV	AUKLET	Marco Skimmer	3	Everett	WA	Trailer 55	48-00.0 N	122-13.0 W
CSCI	R-VS	RV	WIDGEON	Marco Skimmer	30	Seattle	WA	In Water	47-41.0 N	122-24.5 W
CSCI	R-VS	RV	CURLEW	Marco Skimmer	3	Tacoma	WA	In Water	47-16.5 N	122-24.5 W
CSCI	R-VS	RV	PLOVER	Marco Skimmer	67	Tacoma	WA	In Water	47-16.5 N	122-24.5 W
NRCES	R-VS	RV	Belt Skimmer Vessel	Marco /1C, #2, 6060	43	Seattle, Pt Wells	WA	Trailer #6067	47-46.5N	122-24W
CSCI	R-VS	RV	HERON	40' Skimmer		Bellingham	WA	In Water	48-45.3 N	122-30.8 W
CSCI	R-VS	RV-1	SHEARWATER	JBF Skimmer	1,362	Port Angeles	WA	In Water	48-07.6 N	123-27.2 W
CSCI	R-VS	RV-2	CORMORANT	Marco Skimmer	90	Seattle	WA	In Water	47-41.0 N	122-24.5 W
CSCI	R-VS	RV-2	ROYAL TERN	JBF Skimmer	276	Anacortes	WA	In Water	48-31.0 N	122-36.3 W

Legend

R (recovery) + column for storage amount. SWB = shallow water barge with recovery device on board.

S (storage): TV = tank vessel (self-propelled); TB = tank barge (requires move assist); SWB = shallow water barge (**no** recovery device); VT = vacuum truck; TT = tank truck; PT = portable tank (e.g., Baker, Frac, R-for-Rent); PB = portable bladder; PD = portable drum; px = portatable – other (fish tote, etc.)

V (vessel): *Tug Barbara Foss*; *M/V Acme* (off-shore supply boat – i.e., a big WB); FRV-7 *Tacoma*; WN-2345-SL; #1023

OSRO (6)	Resource (12)	Kind - Type (6)	Identification (24)	Specifications (12)	Liquid Storage bbls (10)	Home Base (12)	State (2)	Staging (13)	Latitude (10)	Longitude (10)
CSCI	R-VS	RV-2	WESTERN GULL	JBF Skimmer	286	Bellingham	WA	In Water	48-45.3 N	122-30.8 W
CSCI	R-VS	RV-2	ARCTIC TERN	JBF Skimmer	276	Port Angeles	WA	In Water	48-07.6 N	123-27.2 W
CNRNW	R-VS	WB - 3	Skimmer, Vessel Kvichak Rapid Response	29 ft		Manchester Fuel	WA	Shltr E. Bldg 1	47-37.0N	122-32.5W
CNRNW	R-VS	WB - 3	Skimmer, Vessel Kvichak Rapid Response	28 ft, 135 hp		Whidbey	WA		40-20.3N	122-40.0W
CNRNW	R-VS	WB - 3	Skimmer, Vessel Kvichak Rapid Response			Bremerton	WA	Finger Pier	47-33.4N	122-38.0W
CNRNW	R-VS	WB - 3	Skimmer, Vessel Kvichak Rapid Response			Bremerton	WA	Finger Pier	47-33.4N	122-38.0W
CNRNW	R-VS	WB - 3	Skimmer, Vessel Kvichak Rapid Response			Bangor	WA		47-28.5N	122-28.2W
CNRNW	R-VS	WB - 3	Skimmer, Vessel Kvichak Rapid Response		24	Everett	WA		47-54.0N	122-13.0W
CNRNW	R-VS		Skimmer, Vessel JBF DIP 3001			Bremerton	WA	Finger Pier	47-33.4N	122-38.0W
CNRNW	R-VS		Skimmer, Vessel JBF DIP 3001			Bangor	WA		47-28.5N	122-28.2W
CNRNW	R-VS		Skimmer, Vessel Willard Rapid Response		24	Indian Island	WA		40-02.0N	122-43.0W
CNRNW	R-VS		Skimmer, Willard Rapid Response		12	Keyport	WA		47-42.0N	122-37.0W
CRC	R-VS-34	WB-3	OSRV "Alliance" (22-202)	34' Kvichak	24	Portland	OR	Freds	45*3715N	122*48.21W

Legend

R (recovery) + column for storage amount. SWB = shallow water barge with recovery device on board.

S (storage): TV = tank vessel (self-propelled); TB = tank barge (requires move assist); SWB = shallow water barge (**no** recovery device); VT = vacuum truck; TT = tank truck; PT = portable tank (e.g., Baker, Frac, R-for-Rent); PB = portable bladder; PD = portable drum; px = portatable – other (fish tote, etc.)

V (vessel): *Tug Barbara Foss*; *M/V Acme* (off-shore supply boat – i.e., a big WB); FRV-7 *Tacoma*; WN-2345-SL; #1023

OSRO (6)	Resource (12)	Kind - Type (6)	Identification (24)	Specifications (12)	Liquid Storage bbls (10)	Home Base (12)	State (2)	Staging (13)	Latitude (10)	Longitude (10)
CRC	R-VS-34	WB-3	OSRV "Hatfield" (23-203)	34' Kvichak	24	Cathlamet	WA	Marina	46*12.41N	123*23.41W
CRC	R-VS-34	WB-3	OSRV "MFSA 1" (20-200)	34' Kvichak	24	Ranier	OR	FOSS	46*05.35N	122*55.69W
BCO	R-VS-42	RV-2	Vessel - Self-Propelled	LORI 6 brush	94	Van Harbour	BC	Burrard Cleaner No. 1	49-18.0N	122-56.0W
BCO	R-VS-50	RV-2	Vessel - BC No. 2	Marco belt 50	85	Van Harbour	BC	Cates Dock	49-18.0N	122-56.0W
BCO	R-VS-75	RV-1	Vessel - BC No. 9	Offshore 75	502	Victoria Harbour	BC	D Jetty	48-26.0N	123-26.0W
NRC	SB	SB-3	Vessel-OSRV 738	NRC Columbia		Richmond	CA	on water-SugarDock	37:57:05N	122:21:39W
NRC	SB	SB-3	Boat-BHSS-109	30' 300 hp. Boom Handling Skimmer Support		Martinez	CA	Marina	38:00:03N	122:06:52W
NRC	S-PS	PS-1	Barge,3	PORTABLE-KVICHAK	238	Martinez	CA	Marina-on barge set	38:00:03N	122:06:52W
NRC	S-PS	PS-1	Barge,3	PORTABLE-KVICHAK	238	Richmond	CA	SugarDock on portable barge set	37:57:05N	122:21:39W
NRC	S-PS	PS-1	Barge,3	PORTABLE-KVICHAK	1,434	CAP	CAP			
CRC	S-SWB	PS-3	Shallow Water Barge (29-235)	30' Kvichak	100	Portland	OR	PFB	45*32.96N	122*42.28W
CRC	S-SWB	PS-3	Shallow Water Barge (29-236)	30' Kvichak	100	Portland	OR	CRC	45*00.17N	122*54.55W
CRC	S-SWB	PS-3	Shallow Water Barge (29-227)	30' American Eagle	100	Astoria	OR	CCS-AST	46*11.30N	123*51.27W
CRC	S-SWB	PS-3	Shallow Water Barge (29-232)	30' American Eagle	100	Longview	WA	Weyco	46*07.92N	122*58.64W
CSCI	S-SWB	PS-4	PS #1	Mini Barge	110	Anacortes	WA	Trailer 43	48-31.0 N	122-36.3 W
CSCI	S-SWB	PS-4	PS #2	Mini Barge	110	Anacortes	WA	Trailer 44	48-31.0 N	122-36.3 W
CSCI	S-SWB	PS-4	PS #3	Mini Barge	100	Tacoma	WA	In Water	47-16.5 N	122-24.5 W

Legend

R (recovery) + column for storage amount. SWB = shallow water barge with recovery device on board.

S (storage): TV = tank vessel (self-propelled); TB = tank barge (requires move assist); SWB = shallow water barge (**no** recovery device); VT = vacuum truck; TT = tank truck; PT = portable tank (e.g., Baker, Frac, R-for-Rent); PB = portable bladder; PD = portable drum; px = portatable – other (fish tote, etc.)

V (vessel): *Tug Barbara Foss*; *M/V Acme* (off-shore supply boat – i.e., a big WB); FRV-7 *Tacoma*; WN-2345-SL; #1023

OSRO (6)	Resource (12)	Kind - Type (6)	Identification (24)	Specifications (12)	Liquid Storage bbls (10)	Home Base (12)	State (2)	Staging (13)	Latitude (10)	Longitude (10)
NRCES	S-TB	TV	Barge Tankage	Washington, 248x56x17	31,110	Puget Sound	WA	Moorage		
NRCES	S-TB	TV	Barge Tankage	Foss 286, D578543	45,500	Puget Sound	WA	Moorage		
NRCES	S-TB	TV	Barge Tankage	Foss 252, 312x56x18	14,528	Puget Sound	WA	Moorage		
NRCES	S-TB	TV	Barge Tankage	Foss 248-P3, D653750	26,100	Puget Sound	WA	Moorage		
NRCES	S-TB	TV	Barge Tankage	Foss 248-P2, D623438	26,100	Puget Sound	WA	Moorage		
NRCES	S-TB	TV	Barge Tankage	Foss 185-P3, 185x50x12, D622241	11,900	Puget Sound	WA	Moorage		
NRCES	S-TB	TV	Barge Tankage	Foss 185-P2, 185x50x12,	11,900	Puget Sound	WA	Moorage		
NRCES	S-TB	TV	Barge Tankage	Foss 185-P1, 185x50x12, D613867	11,900	Portland	OR	Moorage		
NRCES	S-TB	TV	Barge Tankage	BMC-7, 204x42x11, CG020784	10,000	Portland	OR	Moorage		
NRCES	S-TB	TV	Barge Tankage	BMC-4, 120x33x10, D523863	5,580	Portland	OR	Moorage		
NRCES	S-TB	TV	Barge Tankage	BMC-3, 240x50x10, D273667	19,000	Portland	OR	Moorage		
NRCES	S-TB	TV	Barge Tankage	BMC-10, D682953	14,999	Puget Sound	WA	Moorage		
CNRNW	S-TB	TV - 2	Barge, Storage YOGN - 123	235 ft	13,500	Manchester Fuel	WA	Fuel Pier	47-37.0N	122-32.5W
CNRNW	S-TB	TV - 2	Barge, Storage YOGN - 124	235 ft	13,500	Manchester Fuel	WA	Fuel Pier	47-37.0N	122-32.5W
CNRNW	S-TB	TV - 2	Barge, Storage YON - 319	229 ft	14,500	Manchester Fuel	WA	Fuel Pier	47-37.0N	122-32.5W
CNRNW	S-TB	TV - 2	Barge, Storage YON - 315	184 ft	10,000	Manchester Fuel	WA	Fuel Pier	47-37.0N	122-32.5W

Legend

R (recovery) + column for storage amount. SWB = shallow water barge with recovery device on board.

S (storage): TV = tank vessel (self-propelled); TB = tank barge (requires move assist); SWB = shallow water barge (**no** recovery device); VT = vacuum truck; TT = tank truck; PT = portable tank (e.g., Baker, Frac, R-for-Rent); PB = portable bladder; PD = portable drum; px = portatable – other (fish tote, etc.)

V (vessel): *Tug Barbara Foss*; *M/V Acme* (off-shore supply boat – i.e., a big WB); FRV-7 *Tacoma*; WN-2345-SL; #1023

OSRO (6)	Resource (12)	Kind - Type (6)	Identification (24)	Specifications (12)	Liquid Storage bbls (10)	Home Base (12)	State (2)	Staging (13)	Latitude (10)	Longitude (10)
CSCI	S-TB	TV-2	PELICAN	Tank Barge	11,900	Bellingham	WA	In Water	48-45.3 N	122-30.8 W
CSCI	S-TB	TV-2	KITTIWAKE	Tank Barge	23,400	Port Angeles	WA	In Water	48-07.6 N	123-27.2 W
CSCI	S-TB	TV-2	IBIS	Tank Barge	21,403	Tacoma	WA	In Water	47-16.5 N	122-24.5 W
CNRNW	S-TB		Barge, Storage YON 309	184 ft	10,000	Bremerton	WA	Waterfront	47-33.4N	122-38.0W
CNRNW	S-TB		Barge, Storage YON 314	184 ft	10,000	Bremerton	WA	Waterfront	47-33.4N	122-38.0W
CNRNW	S-TB		Barge, Storage YON 102	165 ft	8,619	Bremerton	WA	Waterfront	47-33.4N	122-38.0W
BCO	S-TB-167	TV-2	Vessel - Barge BC No.17		7,076	Van Harbour	BC	PR Fishermen's Coop	49-18.0N	122-56.0W
BCO	S-TB-185	TV-2	Vessel - Barge		13,460	Esquimalt Harbour	BC	D Jetty	48-26.0N	123-26.0W
BCO	S-TB-30	TB-3	Vessel - Barge BC No.12		100	Van Harbour	BC	Petro-Canada dock	49-18.0N	122-56.0W
NRC	S-VSO	RV-	Vessel	OSRB-NRC Humboldt Bay-260-52-12	32,000	Eureka	CA	on water-Eureka	40:47:43N	124:09:20W
NRCES	S-VT	S-VT	Tankage	Vessel Tankage	320	Neah Bay	WA	OSRV Cape Flattery	48-21.1N	124-37.0W
MSRC	V CB 10	V CB	Large RHIB 9m	Response 5, Crew Shuttle		Everett	WA	Trailer	48-00.00 N	122-13.00 W
MSRC	V CB 6	V CB	OSRV, Oregon Responder	6m Rigid Hull Boat		Astoria	OR	Ship	46-10.50 N	123-51.20 W
MSRC	V CB 6	V CB	OSRV, Oregon Responder	6m Rigid Hull Boat		Astoria	OR	Ship	46-10.50 N	123-51.20 W
MSRC	V CB 6	V CB	OSRV, Park Responder	6m Rigid Hull Boat		Port Angeles	WA	Ship	48-07.50 N	123-26.45 W
MSRC	V CB 6	V CB	OSRV, Park Responder	6m Rigid Hull Boat		Port Angeles	WA	Ship	48-07.50 N	123-26.45 W
MSRC	V TV 38,000	V TV	Oil Spill Response Barge 380	Ocean Barge	38,000	Port Angeles	WA	Barge	48-07.50 N	123-26.45 W

Legend

R (recovery) + column for storage amount. SWB = shallow water barge with recovery device on board.

S (storage): TV = tank vessel (self-propelled); TB = tank barge (requires move assist); SWB = shallow water barge (**no** recovery device); VT = vacuum truck; TT = tank truck; PT = portable tank (e.g., Baker, Frac, R-for-Rent); PB = portable bladder; PD = portable drum; px = portatable – other (fish tote, etc.)

V (vessel): *Tug Barbara Foss*; *M/V Acme* (off-shore supply boat – i.e., a big WB); FRV-7 *Tacoma*; WN-2345-SL; #1023

OSRO (6)	Resource (12)	Kind - Type (6)	Identification (24)	Specifications (12)	Liquid Storage bbls (10)	Home Base (12)	State (2)	Staging (13)	Latitude (10)	Longitude (10)
MSRC	V TV 40,000	V TV	Oil Spill Response Barge 404	Ocean Barge	40,000	Astoria	OR	Barge	46-10.50 N	123-51.20 W
MSRC	V WB 26	V WB	Utility Boat / Small Support	Utility Boat<29'		Everett	WA	Trailer	48-00.00 N	122-13.00 W
MSRC	V WB 26	V WB	Shallow Water Barge 25	4-1 Utility Boat<29'		Portland	OR	Trailer	45-36.40 N	122-41.30 W
MSRC	V WB 26	V WB	Shallow Water Barge 23	17-4 Utility Boat <29'		Coos Bay	OR	Trailer	43-22.00 N	124-10.70 W
MSRC	V WB 26	V WB	Shallow Water Barge 51	17-3 Utility Boat <29'		Bellingham	WA	Trailer	48-00.00 N	122-13.00 W
MSRC	V WB 26	V WB	Shallow Water Barge 21	17-2 Utility Boat <29'		Port Angeles	WA	Trailer	48-07.50 N	123-26.45 W
MSRC	V WB 26	V WB	Shallow Water Barge 19	16-3 Utility Boat <29'		Astoria	OR	Trailer	46-10.50 N	123-51.20 W
MSRC	V WB 26	V WB	Shallow Water Barge 123	12-3 Utility Boat <29'		Seattle	WA	Trailer	47-35.00 N	122-20.80 W
MSRC	V WB 32	V WB	Large Support Boat	Munson, Cascade		Neah Bay	WA	Dock	48-22.00 N	124-36.75 W
MSRC	V WB 32	V WB	OSRV, Oregon Responder	Large Support Boat		Astoria	OR	Ship	46-10.50 N	123-51.20 W
MSRC	V WB 32	V WB	OSRV, Park Responder	Large Support Boat		Port Angeles	WA	Ship	48-07.50 N	123-26.45 W
CCS	V-B-92		B-92, Boomer 55" Response Vess	55', 700 hp		Astoria			46-10.50N	123-51.20W
BCO	V-TB-45	RV-3	Vessel - Barge	BC No. 16		Port Alberni	BC	Government Dock	49-16.0N	124-46.0W
CCS	V-WB		B-92	55' Response Ves-sel 1200' 36" boom		ASTORIA	OR		44-37.78N	123-3.96W
NRCES	V-WB	WB	Workboat	Otter, landing-craft, #6403		Seattle, Pt Wells	WA	Yard	47-46.5N	122-24W
CCS	V-WB 21		B-86	21' Fiberform 120HP on trailer		LONGVIEW	WA		46-07.00N	123-57.10W
CCS	V-WB 22		B-89	22' Landing Craft 600' 20" boom		LONGVIEW	WA		46-07.00N	123-57.10W

Legend

R (recovery) + column for storage amount. SWB = shallow water barge with recovery device on board.

S (storage): TV = tank vessel (self-propelled); TB = tank barge (requires move assist); SWB = shallow water barge (**no** recovery device); VT = vacuum truck; TT = tank truck; PT = portable tank (e.g., Baker, Frac, R-for-Rent); PB = portable bladder; PD = portable drum; px = portatable – other (fish tote, etc.)

V (vessel): *Tug Barbara Foss*; *M/V Acme* (off-shore supply boat – i.e., a big WB); FRV-7 *Tacoma*; WN-2345-SL; #1023

OSRO (6)	Resource (12)	Kind - Type (6)	Identification (24)	Specifications (12)	Liquid Storage bbls (10)	Home Base (12)	State (2)	Staging (13)	Latitude (10)	Longitude (10)
CCS	V-WB 24		B-90	24' Work Boat W 500' 20" boom trailerable		PORTLAND	OR		45-34.00N	122-46.00W
CNRNW	V-WB-18	SB - 2	Work Boat, Kvichak	21 ft		Bremerton	WA	Finger Pier	47-33.4N	122-38.0W
CNRNW	V-WB-18	SB - 2	Work Boat, Kvichak	21 ft		Bremerton	WA	Finger Pier	47-33.4N	122-38.0W
CNRNW	V-WB-18	SB - 2	Work Boat, Kvichak	21 ft		Bremerton	WA	Finger Pier	47-33.4N	122-38.0W
CSCI	V-WB-18	SB-3	EGRET	Seine Skiff		Anacortes	WA	In Water	48-31.0 N	122-36.3 W
CSCI	V-WB-18	SB-3	JAEGER	Seine Skiff		Everett	WA	Warehouse	48-00.0 N	122-13.0 W
CSCI	V-WB-18	SB-3	WILLET	Seine Skiff		Port Angeles	WA	Ondeck KITTIWAKE	48-07.6 N	123-27.2 W
CSCI	V-WB-18	SB-3	SNIPE	Seine Skiff		Tacoma	WA	In Water	47-16.5 N	122-24.5 W
CNRNW	V-WB-20	SB - 2	Work Boat, Boston Whaler	20 ft, 150 hp		Manchester Fuel	WA	Pre-deployed - east fuel pier; Trailered - SloMo Shelters by vehicle maintenance	47-37.0N	122-32.5W
CNRNW	V-WB-20	SB - 2	Work Boat, Boston Whaler	20 ft, 150 hp		Manchester Fuel	WA	Pre-deployed - east fuel pier; Trailered - SloMo Shelters by vehicle maintenance	47-37.0N	122-32.5W
CNRNW	V-WB-20	SB - 2	Work Boat, Boston Whaler	20 ft, 150 hp		Manchester Fuel	WA	Pre-deployed - east fuel pier; Trailered - SloMo Shelters by vehicle maintenance	47-37.0N	122-32.5W
CNRNW	V-WB-20	SB - 2	Kvichak Utility Boat	20 ft		Everett	WA		47-54.0N	122-13.0W
CSCI	V-WB-20	SB-2	SHEARWATER, DUNLIN	RIB		Port Angeles	WA	RV SHEARWATER	48-07.6 N	123-27.2 W
CNRNW	V-WB-21	SB - 2	Work Boat, SeaArk	21 ft, 150 hp		Manchester Fuel	WA		47-37.0N	122-32.5W
CNRNW	V-WB-21	SB - 2	Work Boat, Sea Ark	21 ft, 150 hp		Whidbey	WA		40-20.3N	122-40.0W
CNRNW	V-WB-21	SB - 2	Work Boat, Sea Ark	21 ft, 120 hp		Whidbey	WA		40-20.3N	122-40.0W

Legend
R (recovery) + column for storage amount. SWB = shallow water barge with recovery device on board.
S (storage): TV = tank vessel (self-propelled); TB = tank barge (requires move assist); SWB = shallow water barge (**no** recovery device); VT = vacuum truck; TT = tank truck; PT = portable tank (e.g., Baker, Frac, R-for-Rent); PB = portable bladder; PD = portable drum; px = portatable – other (fish tote, etc.)
V (vessel): *Tug Barbara Foss*; *M/V Acme* (off-shore supply boat – i.e., a big WB); FRV-7 *Tacoma*; WN-2345-SL; #1023

OSRO (6)	Resource (12)	Kind - Type (6)	Identification (24)	Specifications (12)	Liquid Storage bbls (10)	Home Base (12)	State (2)	Staging (13)	Latitude (10)	Longitude (10)
CNRNW	V-WB-21	SB - 2	Work Boat, Sea Ark	21 ft		Everett	WA		47-54.0N	122-13.0W
CNRNW	V-WB-21	SB - 2	Work Boat, Sea Ark	21 ft		Everett	WA		47-54.0N	122-13.0W
CNRNW	V-WB-21	SB - 2	SeaArk Utility Boat	21 ft		Everett	WA		47-54.0N	122-13.0W
CNRNW	V-WB-21	SB - 2	Work Boat, Kvichak	21 ft		Indian Island	WA		40-02.0N	122-43.0W
CNRNW	V-WB-21	SB - 2	Work Boat, Kvichak	21 ft		Indian Island	WA		40-02.0N	122-43.0W
CNRNW	V-WB-21	SB - 2	Work Boat, Sea Ark	21 ft		Keyport	WA		47-42.0N	122-37.0W
CNRNW	V-WB-21	SB - 2	Work Boat, Boston Whaler	21 ft		Keyport	WA		47-42.0N	122-37.0W
NRCES	V-WB-21	WB	Spill Response Vessel	Boston Whaler 21', #6015		Portland	OR	Trailer #6062	45-33.79N	122-43.41W
CNRNW	V-WB-22	SB - 2	Work Boat, Monarch	24 ft		Bremerton	WA	Finger Pier	47-33.4N	122-38.0W
GDS	V-WB-22		Whaler	22 ft, 25 knots		Seattle	WA	yard	47-34.14N	122-21.20W
NRCES	V-WB-23	WB	Response Vessel 23'	Munson Pacman, #6034		Seattle, Pt Wells	WA	Trailer (LC#4609-ns)	47-46.5N	122-24W
CNRNW	V-WB-25	SB - 2	Work Boat, Boston Whaler	25 ft, 150 hp		Whidbey	WA		40-20.3N	122-40.0W
CNRNW	V-WB-25	SB - 2	Work Boat, Boston Whaler	25 ft		Bangor	WA		47-28.5N	122-28.2W
NRCES	V-WB-25	WB	Spill Response Vessel	Munson 25', #6035		Rainier, FMC	OR	Moorage	46-05.1N	122-56.2W
CNRNW	V-WB-26	SB - 2	Work Boat, American Eagle	26 ft, 100 hp		Manchester Fuel	WA	E Fuel Pier	47-37.0N	122-32.5W
NRCES	V-WB-27	WB	Workboat 27'	Husky Raider Aluminum		Seattle, Pt Wells	WA	Yard	47-46.5N	122-24W
CNRNW	V-WB-30	SB - 1	Work Boat, Sea Ark Platform	30 ft		Everett	WA		47-54.0N	122-13.0W
CNRNW	V-WB-30	SB - 1	Work Boat, Sea Ark Platform	30 ft		Everett	WA		47-54.0N	122-13.0W
CNRNW	V-WB-30	SB - 2	Work Boat, Sea Ark Platform	30 ft, 115 hp		Whidbey	WA		40-20.3N	122-40.0W

Legend

R (recovery) + column for storage amount. SWB = shallow water barge with recovery device on board.

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V (vessel): *Tug Barbara Foss*; *M/V Acme* (off-shore supply boat – i.e., a big WB); FRV-7 *Tacoma*; WN-2345-SL; #1023

OSRO (6)	Resource (12)	Kind - Type (6)	Identification (24)	Specifications (12)	Liquid Storage bbls (10)	Home Base (12)	State (2)	Staging (13)	Latitude (10)	Longitude (10)
CNRNW	V-WB-30	SB - 2	Work Boat, SeaArk Platform	30 ft		Bremerton	WA	Finger Pier	47-33.4N	122-38.0W
CNRNW	V-WB-30	SB - 2	Work Boat, SeaArk Platform	30 ft		Bangor	WA		47-28.5N	122-28.2W
CNRNW	V-WB-30	SB - 2	Work Boat, Sea Ark Platform	30 ft		Bangor	WA		47-28.5N	122-28.2W
CNRNW	V-WB-30	SB - 2	Work Boat, Sea Ark Platform	30 ft		Keyport	WA		47-42.0N	122-37.0W
CNRNW	V-WB-32	SB - 1	Work Boat, Sea Ark Platform	32 ft, 115 hp		Manchester Fuel	WA	Shltr Bldg 194	47-37.0N	122-32.5W
CNRNW	V-WB-32	SB - 1	Work Boat, Munson Platform	32 ft		Bangor	WA		47-28.5N	122-28.2W
NRCES	V-WB-32	WB	Response Vessel 32'	Kvichak FRV #9, #6055		Seattle, P-90	WA	Moorage	47-37.9N	122-22.8W
NRCES	V-WB-32	WB	Response Vessel 32'	Kvichak FRV #8, #6053		Anacortes	WA	Moorage	48-30.8N	122-36.5W
NRCES	V-WB-32	WB	Response Vessel 32'	Kvichak FRV #7, #6051		Tacoma, FMC	WA	Moorage	47-15.75N	122-26.00W
NRCES	V-WB-32	WB	Response Vessel 32'	Kvichak FRV #6, #6049		Bellingham, Port	WA	Moorage	48-44.8N	122-29.5W
NRCES	V-WB-32	WB	Response Vessel 32'	Kvichak FRV #5, #6047		Everett	WA	Moorage	47-58.8N	122-13.2W
NRCES	V-WB-32	WB	Response Vessel 32'	Kvichak FRV #4, #6045		Port Angeles	WA	Moorage	48-07.2N	123-27.5W
NRCES	V-WB-32	WB	Response Vessel 32'	Kvichak FRV #3, #6042		Aberdeen	WA	Moorage	45-58.8N	123-53.0W
NRCES	V-WB-32	WB	Response Vessel 32'	Kvichak FRV #2, #6039		Sekiu	WA	Moorage	48-15.1N	124-18.W
NRCES	V-WB-32	WB	Response Vessel 32'	Kvichak FRV #1, #6036		Astoria, marina	OR	Moorage	46-10.96N	123-51.6W
NRCES	V-WB-32	WB	ServiceVessel 32'	Kvichak 32', #6771	17	Seattle, E.ST	WA	Moorage	47-37.9N	122-22.8W
CSCI	V-WB-32	WB-3	SCOTER	32' Work Boat		Tacoma	WA	In Water	47-16.5 N	122-24.5 W

Legend

R (recovery) + column for storage amount. SWB = shallow water barge with recovery device on board.

S (storage): TV = tank vessel (self-propelled); TB = tank barge (requires move assist); SWB = shallow water barge (**no** recovery device); VT = vacuum truck; TT = tank truck; PT = portable tank (e.g., Baker, Frac, R-for-Rent); PB = portable bladder; PD = portable drum; px = portatable – other (fish tote, etc.)

V (vessel): *Tug Barbara Foss*; *M/V Acme* (off-shore supply boat – i.e., a big WB); FRV-7 *Tacoma*; WN-2345-SL; #1023

OSRO (6)	Resource (12)	Kind - Type (6)	Identification (24)	Specifications (12)	Liquid Storage bbls (10)	Home Base (12)	State (2)	Staging (13)	Latitude (10)	Longitude (10)
CNRNW	V-WB-33	SB - 1	Work Boat, Platform	33 ft		Indian Island	WA		40-02.0N	122-43.0W
NRCES	V-WB-34	WB	Response Vessel 34'	Raider, #6028		Portland, moorage	OR	Moorage	45-33.64N	122-43.65W
NRCES	V-WB-34	WB	Response Vessel 34'	Beaver, #6026		West Port	WA	Moorage	46-54.2N	124-06.5W
CSCI	V-WB-34	WB-3	PUFFIN	33' Work Boat		Port Angeles	WA	In Water	48-07.6 N	123-27.2 W
GDS	V-WB-34		SRV 1	34 ft, 30 knots		Seattle	WA	dock	47-34.14N	122-21.20W
GDS	V-WB-34		SRV 2	34 ft, 30 knots		Tacoma	WA	dock	47-17.75N	122-24.90W
CSCI	V-WB-36	WB-3	TEAL	36' Work Boat		Anacortes	WA	In Water	48-31.0 N	122-36.3 W
CSCI	V-WB-36	WB-3	AVOCET	36' Work Boat		Seattle	WA	In Water	47-41.0 N	122-24.5 W
CSCI	V-WB-36	WB-3	COOT	36' Work Boat		Tacoma	WA	In Water	47-16.5 N	122-24.5 W
BCO	V-WB-38	WB-3	Vessel - Sea Truck	BC No. 6	85	Nanaimo Harbour	BC	D-dock	49-12.0N	123-57.0W
CSCI	V-WB-38	WB-3	MALLARD	38' Work Boat		Port Angeles	WA	In Water	48-07.6 N	123-27.2 W
CSCI	V-WB-38	WB-3	LOON	38' Work Boat		Port Angeles	WA	In Water	48-07.6 N	123-27.2 W
BCO	V-WB-38	WB-3	Vessel - Sea Truck BC No. 7			Van Harbour	BC	Petro-Canada dock	49-18.0N	122-56.0W
CSCI	V-WB-42	WB-3	OSPREY	42' Work Boat		Anacortes	WA	In Water	48-31.0 N	122-36.3 W
CSCI	V-WB-42	WB-3	EAGLE	42' Work Boat		Bellingham	WA	In Water	48-45.3 N	122-30.8 W
BCO	V-WB-49	WB-3	Vessel - Boom Boat		14	Esquimalt Harbour	BC	D Jetty	48-26.0N	123-26.0W
BCO	V-WB-50	WB-2	Vessel - Boom Boat	BC No. 8	14	Van Harbour	BC	Lnwd Marina dock	49-18.0N	122-56.0W
GDS	V-WB-62		Landing craft w/crane	350 HP, 62 ft		Seattle	WA	dock	47-34.14N	122-21.20W
NRC	WB	WB-3	Vessel-WB104	RV Mallard		Neah Bay	WA	In Water-Pt of Neah Bay	48:21:53N	124:36:39W

Legend

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S (storage): TV = tank vessel (self-propelled); TB = tank barge (requires move assist); SWB = shallow water barge (**no** recovery device); VT = vacuum truck; TT = tank truck; PT = portable tank (e.g., Baker, Frac, R-for-Rent); PB = portable bladder; PD = portable drum; px = portatable – other (fish tote, etc.)

V (vessel): *Tug Barbara Foss*; *M/V Acme* (off-shore supply boat – i.e., a big WB); FRV-7 *Tacoma*; WN-2345-SL; #1023

APPENDIX B
GRP Response Strategies

APPENDIX B

Proposed Booming and Collection Strategies: SAN JUAN ISLANDS, North Puget Sound and North Central Puget Sound

Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected	Assets Deployed
NC-1	New Strategy 9/01	Urchin Rocks (Northwest of Bowman Bay and Deception Pass) SKA0468 48°-25/030'N 122°-39.935'W	Exclusion - Keep oil off Urchin Rocks and out of the tide pools on the north shore of Rosario Head.	1900'	Deploy boom from Rosario Beach, out to and around Urchin Rocks and back to the west side of Rosario Head to protect the tide pools on the north shore of Rosario Head. This area is exposed to southerly and westerly weather, fall back and protect as much of Urchin Rocks and the tide pools as possible if the strategy cannot be deployed as described. Rosario Beach is a low priority for this strategy.	Stage from the Bowman Bay boat ramp parking lot, the deception Pass State Park or Anacortes.	By boat from the ramp in Bowman Bay (SKA0472), or from Anacortes. Vehicle access from Highway 20 to Rosario Road.	Protect the tide pools on Rosario Head, rock shoreline, and kelp beds; seabird concentrations, and sensitive nesting species.	**NC-1** 1 - FRV 1 - 55HP Skiff
NC-2	Field Tested 5/00	Bowman Bay and Sharpe Cove (Northwest of Deception Pass) SKA0469 48°-24.820'N 122°-39.565'W	Exclusion - Keep oil out of the bay and cove.	1900'	Deploy boom in a chevron configuration across the entrance to the bay and the cove from the south side of Rosario Head to the northwest corner of Reservation Head. Run the boom between Gull Rocks and Coffin Rocks. This area is exposed to southerly and westerly weather, fall back and protect as much of the bay and cove as possible if the strategy cannot be deployed as described.	Stage from the Bowman Bay boat ramp parking lot, the deception Pass State Park or Anacortes.	By boat from the ramp in Bowman Bay (SKA0472), or from Anacortes. Vehicle access from Highway 20 to Rosario Road.	Protect rocky shoreline and kelp beds, seabird concentrations, and sensitive nesting species.	**NC-2** 1-FRV 1-55HP Skiff

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Proposed Booming and Collection Strategies: SAN JUAN ISLANDS, North Puget Sound and North Central Puget Sound

Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected	Assets Deployed
LOP-34	Field Visit 3/96	Shoal Bay Lagoon (Northeast side of Lopez Island) SNJ0559 48°-33.200'N 122°-52.370'W	Exclusion - Keep oil out of the lagoon at the southeast end of Shoal Bay.	100'	Deploy boom in front of the lagoon culvert. Blocking the culvert with boards, sandbags, etc. would be more effective.	Stage from Port Stanley Road, or at the gravel pit adjacent to the lagoon.	Vehicle access from the Lopez Island ferry terminal on Ferry Road to Port Stanley Road, or by boat from Friday Harbor or Anacortes.	Seabirds, diving ducks, herring, smelt, sandlance larvae, and dungeness crab.	**LOP 34, 35 & 36** Attempt to execute from land without boats & boom. Construct siphon dam from plywood, sand bags & PVC pipe.
LOP-35	Field Visit 3/96	Shoal Bay Lagoon (Northeast side of Lopez Island) SNJ0546 48°-32.500'N 122°-54.440'W	Exclusion - Keep oil out of the lagoon at the south end of Shoal Bay.	100'	Deploy boom in front of the lagoon culvert. Blocking the culvert with boards, sandbags, etc. would be more effective.	Stage from Port Stanley Road, or at the gravel pit adjacent to the lagoon.	Vehicle access from the Lopez Island ferry terminal on Ferry Road to Port Stanley Road, or by boat from Friday Harbor or Anacortes.	Seabirds, diving ducks, brant feeding area, and dungeness crab.	
LOP-36	Field Visit 3/96	Spencer Spit Lagoon (Northeast side of Lopez Island) SNJ0541 48°-32.245'N 122°-51.410'W	Exclusion - Keep oil out of the bay.	100'	Deploy boom in front of the lagoon entrance. Blocking the entrance with boards, sandbags, etc. would be more effective.	Stage near the lagoon on the Spencer Spit State Park access road.	Vehicle access from the Lopez Island ferry terminal on Ferry Road to Port Stanley Road to the Spence Spit State Park, or by boat from Friday Harbor or Anacortes.	Seabirds, brant feeding area, clam beds, tidal marsh.	

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Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected	Assets Deployed
LOP-37	Field Visit 7/99	Hunter Bay (Southeast side of Lopez Island) SNJ0502	Exclusion/ Collection - Keep oil out of bay. Use currents to aid in collection.	3500'	Deploy 2600' of boom from the north shore of the bay at 48°-27.795'N 122°-51.530'W (SNJ0507) to the south shore at 48°-27.570'N 122°-51.025'W (SNJ0503). Deploy an additional 900' of boom from the end of the boom on the south shore to the county dock (SNJ0502), running the boom parallel to the shoreline. Currents during flood tide will push oil to the dock for collection. Additional boom could be deployed north from the dock to improve collection efficiency.	Stage from the county dock at the southeast corner of Hunter Bay, or from Anacortes, Friday Harbor, or Skyline Marina.	By boat from the county dock and ramp, Anacortes, Friday Harbor, or Skyline Marina. Vehicle access from the Lopez Island ferry terminal on Ferry Road to Center Road to Mud Bay Road to Islandale Road.	Seabirds, diving ducks, archaeological sites, smelt, herring, sandlance larvae, and dungeness crab.	**LOP 37, 38a, 38b, 38c, 39 & 40** Total boom deployment 12400'. Set up task force with 3 >40' support boats to "mother" 3 - FRVs 3 - 55HP skiffs. (Continued below)
LOP-38a	Field Visit 7/99	Mud Bay - From the West Shore to Crab Island (Southeast side of Lopez Island) SNJ0502 48°-27.650'N 122°-50.740'W	Exclusion - Keep oil out of the bay.	800'	Deploy boom from Crab Island to the county dock on the west shore. Oil moving past the county dock will be directed to the booms east of Crab Island for collection.	Stage from the county dock at the southeast corner of Hunter Bay, or from Anacortes, Friday Harbor, or Skyline Marina.	By boat from the county dock and ramp, Anacortes, Friday Harbor, or Skyline Marina. Vehicle access from the Lopez Island ferry terminal on Ferry Road to Center Road to Mud Bay Road to Islandale Road.	Seabirds, diving ducks, archaeological sites, smelt, herring spawning, sandlance larvae, and dungeness crab.	
LOP-38b	Field Visit 7/99	Mud Bay - From Crab Island to Fortress Island (Southeast side of Lopez Island) SNJ0484 48°-27.810'N 122°-50.450'W	Exclusion - Keep oil out of the bay.	1800'	Deploy boom from Crab Island to Fortress Island in a chevron configuration with the apex pointed into Mud Bay. Rock anchors have been installed at the high and low tide lines on the southwest corner of Fortress Island, directly across from Crab Island. Oil moving past the county dock and Crab Island will be directed to this boom for collecting with a skimmer. Current moving between the islands may be fairly strong.	Stage from the county dock at the southeast corner of Hunter Bay, or from Anacortes, Friday Harbor, or Skyline Marina.	By boat from the county dock and ramp, Anacortes, Friday Harbor, or Skyline Marina. Vehicle access from the Lopez Island ferry terminal on Ferry Road to Center Road to Mud Bay Road to Islandale Road.	Seabirds, diving ducks, archaeological sites, smelt, herring spawning, sandlance larvae, and dungeness crab.	

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Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected	Assets Deployed
LOP-38c	Field Visit 7/99	Mud Bay - From Fortress Island to the Sperry Peninsula shore (Southeast side of Lopez Island) SNJ0485 48°-27.995'N 122°-50.090'W	Exclusion - Keep oil out of the bay.	1700'	Deploy boom from Fortress Island to the shore on the Sperry Peninsula. Oil entrained under the boom between Crab Island and Fortress Island may circle around the bay and move north to this boom.	Stage from the county dock at the southeast corner of Hunter Bay, or from Anacortes, Friday Harbor, or Skyline Marina.	By boat from the county dock and ramp, Anacortes, Friday Harbor, or Skyline Marina. Vehicle access from the Lopez Island terminal on Ferry Road to Center Road to Mud Bay Road to Islandale Road.	Seabirds, diving ducks, archaeological sites surf smelt, herring spawning, sand lance larvae, and dungeness crab.	**LOP 37, 38a, 38b, 38c, 39 & 40** (Continued from above) Total boom deployment 12400'. Set up task force with 3 >40' support boats to "mother" 3 - FRVs 3 - 55HP skiffs. (Cont. below)
LOP-39	New Strategy 8/01	Mud Bay - Backup for LOP-38 SNJ0496	Exclusion - Keep oil out of the bay.	2500'	Deploy boom from the north shore of the bay at 48°-27.050'N 122°-51.070'W (SNJ0498) to the south shore at 48°-26.920'N 122°-50.515'W (SNJ0494).	Stage from the county dock at the southeast corner of Hunter Bay, or from Anacortes, Friday Harbor, or Skyline Marina.	By boat from the county dock and ramp, Anacortes, Friday Harbor, or Skyline Marina. Vehicle access from the Lopez Island terminal on Ferry Road to Center Road to Mud Bay Road to Islandale Road.	Seabirds, diving ducks, archaeological sites surf smelt, herring spawning, sand lance larvae, and dungeness crab.	
LOP-40	New Strategy 8/01	Mud Bay - Backup for LOP-38 (Mud Bay side of Shoal Bight) SNJ0488 48° 27.705'N 122°-49.745'W	Exclusion - Keep oil out of the bay.	2100'	Deploy boom across the entrance to the cove to protect the lagoon and tidal marsh.	Stage from the county dock at the southeast corner of Hunter Bay, or from Anacortes, Friday Harbor, or Skyline Marina.	By boat from the county dock and ramp, Anacortes, Friday Harbor, or Skyline Marina. Vehicle access from the Lopez Island terminal on Ferry Road to Center Road to Mud Bay Road to Islandale Road.	Seabirds, diving ducks, archaeological sites surf smelt, herring spawning, sand lance larvae, and dungeness crab.	

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Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected	Assets Deployed
LOP-41	Field Test 9/99	Warmouth Bay (Southeast corner of Lopez Island in Rosario Straits) SNJ0456 48°-25.915'N 122°-48.710'W	Exclusion - Keep oil out of the bay.	1000'	Deploy boom across the bay at a point about half way into the bay. Feasibility depends on the direction and speed of the wind. This site is usually protected and the boom is easy to set.	Stage from Anacortes, Skyline Marina, or Port Angeles.	By boat from Anacortes, Port Angeles, or Skyline Marina.	Nesting and foraging seabirds, foraging and resting habitat for marbled murrelets. Sensitive nesting species site at the head of the bay.	**LOP 41 & 42** 1- FRV 1 - 55HP skiff
LOP-42	Field Test 9/99	McArdle Bay (South end of Lopez Island) SNJ0443 48°-25.600'N 122°-49.780'W	Exclusion/ Collection - Keep oil out of the bay or use a collection site.	1000'	Deploy boom across the entrance to the bay if conditions are favorable, site is exposed and often rough. Currents and wind tend to push oil in to the bay. To use the bay for collection, deploy the boom out form each side of the entrance collection. Move boom across the entrance of the bay to keep the oil in the bay during ebb tide.	Stage from Anacortes, Skyline Marina, or Port Angeles.	By boat from Anacortes, Friday Harbor, or Skyline Marina. Vehicle access from the Lopez Island ferry terminal to the beach at the head of Aleck Bay via private roads.	Nesting and foraging seabirds, foraging and resting habitat for marbled murrelets.	
LOP-43	Field Test 9/99	Hughes Bay (South end of Lopez Island) SNJ0438 48°-25.730'N 122°-51.090'W	Exclusion - Keep oil out of the bay.	1500'	Deploy boom across the entrance to the bay if conditions are favorable, site is exposed and often rough. Wind from the south or southwest, the boom can be deployed from the west side bay entrance to a point at the head of the bay to the north, which will protect most of the bay. To use the bay for collection, deploy the boom out from each side of the entrance to enhance collection. Move boom across the entrance of the bay to keep the oil in the bay during ebb tide.	Stage from Anacortes, Skyline Marina, or Port Angeles.	By boat from Anacortes, Friday Harbor, or Skyline Marina. Vehicle access from the Lopez Island ferry terminal to the beach at the head of Aleck Bay via private roads.	Nesting seabirds , other marine bird species, sea urchins, archaeological sites.	**LOP 43 & 44** 1 > 40' support boat to "mother" 1 - FRV 1 - 55HP skiff.
LOP-44	New strategy Field Tested 9/99	Aleck Bay (South end of Lopez Island) SNJ0429 48°-25.560'N 122°-51.090'W	Exclusion - Keep oil out of the bay.	1700'	Deploy boom across the narrowest point at the mouth of the bay. Aleck Bay is the least exposed of the three strategies in this area, and booming is achievable more often than for Hughes and McArdle Bays.	Stage from Anacortes, Skyline Marina, or Port Angeles.	By boat from Anacortes, Port Angeles, or Skyline Marina. Vehicle access from the Lopez Island ferry terminal to the beach at the head of Aleck Bay via private roads.	Nesting seabirds , other marine bird species, sea urchins, archaeological sites.	

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Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected	Assets Deployed
NPS-23	New strategy 5/01	Legoe Bay (West side of Lummi Island) WHA0253 48°-42.935'N 122°-42.045'W	Exclusion - Keep oil out of Legoe Bay.	1200'	Deploy boom Lovers Bluff to north shoreline of Legoe Bay. Deploy only if the oil is coming from the south and outer Legoe Bay is being used to collect oil from the Village Pont strategy.	Stage from Sandy Point Marina or Lummi Island ferry terminal.	By boat from Sandy Point Marina Bellingham or Anacortes. Vehicle access by taking Lummi Island ferry and driving to Village Road.		**NPS 23 & 24** 2 - FRVs
NPS-24	Field Visit 3/99	Lummi Point (East side of Lummi Island) WHA0231 48°-43.005'N 122°-43.130'W	Collection - Keep oil from moving further up or down the straits.	1000'	Deploy boom from beach on Village Point out into straits and anchor. Boom could be tended with a vessel at tide changes to reposition angles. Oil can be collected form either direction.	Stage from Sandy Point Marina or Lummi Island ferry terminal.	By boat from Sandy Point Marina Bellingham or Anacortes. Vehicle access by taking lummi Island ferry and driving to Village Road.	Eelgrass, herring spawning, sand lance larvae.	
NPS-70		Pocket Beach on North Side of Fidalgo Island SKA0412 48°-31.100'N 122°-37.480'W	Exclusion - Keep oil off the pocket of the beach.	500'	Deploy boom along shore from the north end of "H" Avenue to "I" Avenue at the ferry terminal (Guemes Island ferry),	Stage at the ferry terminal on "I" Avenue	By boat from Anacortes. Vehicle access from "I" Avenue at the ferry terminal.	Surf smelt spawning habitat.	**NPS 70** 1 - 55HP skiff
NPS-71		Ship Harbor SKA0420 48°-30.345'N 122°-40.465'W	Exclusion - Keep oil out of Ship Harbor.	3600'	Deploy boom from piling at the ferry terminal to where road comes down to shore southeast of the terminal. Run boom along outside piling line. Keep boom outside mudflats so it does not dry out at low tide. Anchor offshore, not to pilings.	Stage at Washington Park.	By boat from Washington Park or Anacortes. Vehicle access to the ferry terminal, from I-5 to highway 20 west follow signs to the ferry terminal.	Sand lance and surf smelt spawning habitat. Large concentration of dungeness crabs, eelgrass beds, waterfowl shorebirds and sea urchins.	**NPS 71** 1 > 40' support boat 1 - FRV 1 - 55HP skiff.

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Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected	Assets Deployed
NPS-72	Field Visit 6/99	Shannon Point Research Lab SKA0424 48° 30.060'N 122°-41.070'W	Exclusion - Protect seawater intake to lab and shoreline sites.	1200'	Deploy 200' of boom from shore to the Shannon point daymarker, another 200' of boom from shore to the "submerged crib" (on chart), and 800' of boom parallel to shore to connect he two 200' legs (from the daymarker to the submerged crib).	Stage at Washington Park.	By boat from Washington Park or Anacortes. Vehicle access to the ferry terminal and the beach on a road southeast of the terminal, from I-5 to highway 20 west (follow signs to the ferry), turn left onto Sunset Avenue to park entrance.	Marine laboratory sea water intake, seabirds and shoreline habitat.	**NPS 72 & 73** 1 - FRV 1 - 55HP skiff.
NPS-73	New strategy 5/01	Sunset Beach SKA0427 48°-30.085'N 122°-41.555'W	Exclusion - Keep oil off of Sunset Beach.	1100'	Deploy boom from the rocks at each end of the gravel beach in Washington Park (at the boat ramp),	Stage at Washington Park.	By boat from Washington Park or Anacortes. Vehicle access to the park from I-5 to highway 20 west (follow signs to ferry), turn left onto Sunset Avenue to park entrance.	Surf smelt spawning habitat.	
NPS-74		Burrows Pass SKA0435 48°-29.540'N 122°-41.275'W	Diversion/Collection - Prevent oil from moving into Burrows Bay.	1000'	Deploy boom at an angle out from the cove west of Flounder Bay in Burrows Pass to collect oil moving along the shore from the west. The current in Burrows Pass can be very strong and may require less boom to be deployed at a sharper angle.	Stage at the Skyline Marina or Washington Park	By boat from the Skyline Marina or the Washington Park ramp. Vehicles access from I-5 top Highway 20 west (follow signs to ferry), turn left onto Sunset Avenue and left again onto Skyline Way, then right onto Hughes Lane to cove.	Sea urchins, abalone, Burrows Bay resources.	**NPS 74** 1 -FRV

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Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected	Assets Deployed
NPS-75	Field visit 8/01	Secret Harbor (Southeast Side of Cypress Island) SKA0164 48°-33.350'N 122°41.360'W	Exclusion - Keep oil out of Ship Harbor.	1000'	Deploy boom across the narrowest part of the entrance to the harbor, from the rocky point on the south side of the harbor, directly north to the north shore. Attach boom to the shore or trees, and anchor to maintain position.	Stage from Anacortes or Bellingham.	By boat from Anacortes or Bellingham	Feeding habitat for marbled murrelets, eelgrass beds.	2 - FRVs
NPS-76	Field Visit 8/01	Eagle Harbor (Northeast Side of Cypress Island) SKA0185 48°-35.360'N 122°-41.836'W	Exclusion - Keep oil out the harbor.	1300'	Deploy boom from the ramp on the west shoreline. No attachment point is available at the east bluff; anchor the boom in as near as possible to the bluff.	Stage from Anacortes or Bellingham.	By boat from Anacortes or Bellingham	Feeding habitat for marbled murrelets, eelgrass beds.	
ORC-28	Field Test 5/98	Buck Bay (orcas Island, east Sound) SNJ0829 48°-37.475'N 123°-.0235'W Corr'd Location: 48°-37.149'N 122°-49.963'W	Exclusion - Keep oil out of bay.	1400'	Deploy boom in a chevron configuration from the dock on the west side. This location keeps the boom in water even at low tide, most of bay becomes a mudflat at low tide. Beware of two pinnacle rocks neat the entrance of the bay.	Stage from the parking area at the dock in Olga, or from Friday Harbor or Anacortes.	By boat from Friday Harbor or Anacortes. Vehicle access from Orcas Island ferry, go west and north from the ferry to the Horseshoe Highway and follow Olga and Buck Bay.	Dungeness crab, clam beds, and mudflat habitat.	1 - FRV
SHA-29a	Field Test 9/99	Blind Bay - West Opening (North side of Shaw Island) SNJ0368 48°-35.085'N 122°-56.385'W	Exclusion - Keep oil out of bay.	1000'	Deploy boom form the west side of Blind Island to pilings at a dock on Shaw Island. Be aware of shallow rocks just north of the booming location (site of numerous groundings).	Stage from Bayhead Marina on Orcas Island just east of the ferry dock.	By boat from Friday Harbor or Anacortes. Vehicle access to the ferry terminal.	Seabirds, diving ducks, herring and smelt spawning, sandlance larvae, dungeness crab and sea urchins.	**SHA 29a & 29b** 1 - FRV 1 - 55HP skiff.
SHA-29b	Field Test 9/00	Blind bay - East Opening (North side of Shaw Island) SNJ0358 48°-35.070'N 122°-56.035'W	Exclusion - Keep oil out of bay.	1800'	Deploy boom from a piling south and west of the Shaw Island Ferry Dock to the east side of Blind Island. Also run boom from piling to shore to close short gap. Boom can be deployed in a chevron configuration with the apex pointing into or out of the bay, depending on conditions and whichever is most feasible.	Stage from Bayhead Marina on Orcas Island just east of the ferry dock.	By boat from Friday Harbor or Anacortes. Vehicle access to the Shaw Island ferry terminal.	Seabirds, diving ducks, herring and smelt spawning, sandlance larvae, dungeness crab and sea urchins.	

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SHA-30	Field Test 9/99	Picnic Cove (Southeast side of Shaw Island) SNJ0345 48°-33.840'N 122°-55.280'W	Exclusion - Keep oil out of the Picnic cove.	1000'	Deploy boom across entrance to Picnic Cove, shoreline is private property.	Stage from the county park beach in Indian Cove, or Friday Harbor or Anacortes.	By boat from Friday Harbor or Anacortes	Archeological sites, dungeness crab.	**SHA 30, 31 & 32** 1 > 40' support boat 2 - FRVs 1 - 55HP skiff
SHA-31	Field Test 9/99	Indian Cove (Southeast side of Shaw Island) SNJ0336 48°-33.735'N 122°-56.265'W	Exclusion - Keep oil out of the cove.	2000'	Deploy boom to protect the shoreline in the northwest corner of Indian Cove (South Beach area).	Stage from the county park beach in Indian Cove, or Friday Harbor or Anacortes.	By boat from Friday Harbor or Anacortes. Vehicle access from the Shaw Island ferry terminal on Blind Bay Road to Squaw Bay Road.	Archeological sites, dungeness crab, Shaw County park.	
SHA-32	Field visit 9/99	Squaw Bay (Southeast side of Shaw Island) SNJ0333 48°-33.840'N 122°-55.280'W	Exclusion/ Deflection/ Collection - Keep oil out of bay. Deflect oil to east shore for collection.	1000'	Deploy boom at an angle across the entrance to the bay from a sandy beach on the west side of the entrance, northeast to the east shore of the entrance. The boom on the east shore can be placed so it will deflect oil into a small cove with a skimmer.	Stage from the road at the head of the bay (SNJ0332), or Friday Harbor or Anacortes.	By boat from Friday Harbor or Anacortes. Vehicle access from the Shaw Island ferry terminal on Blind Bay Road to Squaw Bay Road.	Dungeness crab, oysters, archeological sites, shore birds, waterfowl, and tideflats	
JAM-53	Field visit 8/01	James Island - West Side Cove (East of Decatur Island) SNJ0707 48°-30.700'N 122°-46.695'W	Exclusion - Keep oil out of the cove.	1400'	Deploy boom across the narrowest part of the entrance to the cove on the west side of the island, from the point at the north end. Attach boom to the shore or trees, and anchor to maintain position.	Stage from Anacortes or Skyline Marina	Stage from Anacortes or Skyline Marina.	By boat from Anacortes or Skyline Marina. No vehicle access.	**JAM 53 & 54** 2 - FRVs
JAM-54	Field visit 8/01	48°-33.795'N 122°-46.405'W	Exclusion - Keep oil out of the cove.	1000'	Deploy boom across the narrowest part of the entrance to the cove on the west side of the island, from the point at the north end. Attach boom to the shore or trees, and anchor to maintain position.	Stage from Anarcortes or Skyline Marina	Stage from Anacortes or Skyline Marina.	By boat from Anacortes or Skyline Marina. No vehicle access.	